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Revision B

ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic

International Space Station Program

Revision B

May 2001

National Aeronautics and Space Administration
International Space Station Program
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INTERNATIONAL SPACE STATION PROGRAM

ISS PROGRAM PAYLOADS CERTIFICATION OF FLIGHT READINESS IMPLEMENTATION PLAN, GENERIC

MAY 2001

PREFACE

ISS PROGRAM PAYLOADS CERTIFICATION OF FLIGHT READINESS IMPLEMENTATION PLAN, GENERIC

This document establishes a standard approach to be used by the International Space Station (ISS) Program Payloads Office Manager to implement Certification of Flight Readiness (CoFR) responsibility. This is the sole document that establishes specific processes and requirements for certification of payload flight readiness to the ISS Program. The specific responsibilities and process are defined for the ISS Program Payloads Office, along with support required from the implementing organizations.

The contents of this document are consistent with ISS Program direction as specified in SSP 50108, Certification of Flight Readiness Process Document.

This document is under the control of the ISS Program Payloads Control Board (PCB); any changes or revisions shall be approved by the ISS Program PCB.

Richard Nygren
ISS Program Payloads Office Manager

5/30/01
Date

INTERNATIONAL SPACE STATION PROGRAM

ISS PROGRAM PAYLOADS CERTIFICATION OF FLIGHT READINESS IMPLEMENTATION PLAN, GENERIC

CONCURRENCE

MAY 2001

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	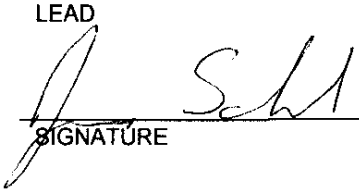 SIGNATURE	5-30-01 DATE
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INTERNATIONAL SPACE STATION PROGRAM

ISS PROGRAM PAYLOADS CERTIFICATION OF FLIGHT READINESS IMPLEMENTATION PLAN, GENERIC

LIST OF CHANGES

MAY 2001

All changes to paragraphs, tables, and figures in this document are shown below:

PCB	Entry Date	Change	Paragraph(s)
	August 1998	Baseline	All
	March 2000	Revision A	All
	June 2000	DCN 001	
	December 2000	DCN 002	
	June 2001	Revision B	All

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APPENDIX

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FIGURE

1.0 INTRODUCTION

1.1 PURPOSE

This document defines the responsibilities, processes, and procedures that the International Space Station (ISS) Program Payloads Office will utilize to certify payload safety and operational readiness as required by the ISS Program.

1.2 SCOPE

The Certification of Flight Readiness (CoFR) process defined herein is applicable to all National Aeronautics and Space Administration (NASA) ISS-funded facility payloads, pallet payloads and payload subrack Hardware/Software (HW/SW), component additions to facility or subrack, Laboratory Support Equipment (LSE), Ground Support Equipment (GSE), Flight Support Equipment (FSE), facilities, personnel that support the payload preparation, payload flight operations, and utilization that is under the purview of the NASA ISS Payloads Office.

The CoFR process will be applied to address flight readiness of HW/SW, ISS ground teams/facilities, safety, and flight crew-related operations and ground team readiness for the increment. The certification process is applicable to all mission phases: launch preparation, launch, on-orbit operations, return, and post-landing operations.

1.3 PRECEDENCE

The ISS Program required process is specified in SSP 50108, Certification of Flight Readiness Process Document. In the event of conflict, the following order of precedence will be followed:

A. SSP 50108

B. Unique Project Plan, the collection of Joint Implementation Plans (JIPs), and/or Payload Integration Agreement (PIA) CoFR implementation agreements

C. SSP 52054, ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic

1.4 DOCUMENT STRUCTURE

The contents of this document define the implementation of the ISS Program CoFR process. The CoFR process includes identification of the endorsements as required by the ISS Program, groundrules supporting endorsements, procedures, CoFR reviews, and required handling of CoFR exceptions. The following appendices contain descriptions of Payloads Office elements and their specific CoFR requirements and content to satisfy CoFR endorsements.

A. Appendix A: Acronyms and Abbreviations.

B. Appendix B: Glossary of Terms.

C. Appendix C: Generic Endorsement Content.

D. Appendix D: ISS Program Payloads Endorsement Checklist by Work Lead - KSC Utilization Office.

E. Appendix E: ISS Program Payloads Endorsement Checklist by Work Lead - Research Program Office and Payload Developer.

F. Appendix F: ISS Program Payloads Endorsement Checklist by Work Lead - Flight Projects Directorate.

G. Appendix G: ISS Program Payloads Endorsement Checklist by Work Lead - Boeing Utilization.

H. Appendix H: ISS Program Payloads Endorsement Checklist by Work Lead - Payload Mission Integration.

I. Appendix I: EXPRESS (MELFI) Endorsement Checklist.

J. Appendix J: Open Work.

1.5 PAYLOAD CoFR PROCESS

This section defines an overview of the CoFR process, defines the CoFR participants and reporting tree, and provides some key process guidelines for implementation of the process.

1.5.1 LAUNCH PACKAGE ASSESSMENT OVERVIEW

The Launch Package Assessment (LPA) provides status of organizations readiness to support launch and mission operations. This status is made against open work required to complete CoFR. Included in the status will be a statement of readiness for payload transfer to the pad. This status is less formal than the actual CoFR, is not an endorsement and does not require objective evidence as part of the status report.

1.5.2 CoFR OVERVIEW

A. A formal and disciplined process with readiness certification statements is required by the ISS Program Manager to support flight readiness decisions on ISS payloads and organizations for:

   1. CoFR for a flight; payload design and as built, safety, crew and ground readiness, operations products, mission planning, and payload return.

   2. CoFR for an increment (at first flight of an increment); crew and ground team related operational readiness for the entire increment.

3. CoFR for payloads already on-orbit; on-orbit payloads will be endorsed as part of CoFR if:

   a. HW/SW to be launched is supported by the on-orbit payload (on-orbit readiness to receive/support the payload and the new on-orbit configuration will be endorsed).

   b. HW/SW configuration has been modified since last CoFR, or time cycle limit constraint. An FPD CoFR will be provided stating that the mission plan is supported by the on-orbit payload anomaly status and resolution plan.

   NOTE: Replacement of a sample may not be considered a configuration change. In this case, consult with the Increment Payload Manager (IPM).

4. CoFR for returned payloads; endorse that unique payload procedures for return and ground handling reflect disposition of any in-flight anomalies and that the payload is compatible with return vehicle environment.

B. Figure 1.5-1, CoFR Process Overview, summarizes the functional areas where certification must be made. The ISS Program has defined specific endorsement requirements for the ISS Program Payloads Office in these functional areas.

C. This CoFR plan will establish a standard process and requirements that will be applied for each flight and increment to satisfy the ISS Program requirements. Appendix C identifies ISS Program-provided endorsements and payload subendorsements that define the detailed payload CoFR content. Appendices D through I will be used as checklists to implement flight-specific CoFR endorsements.

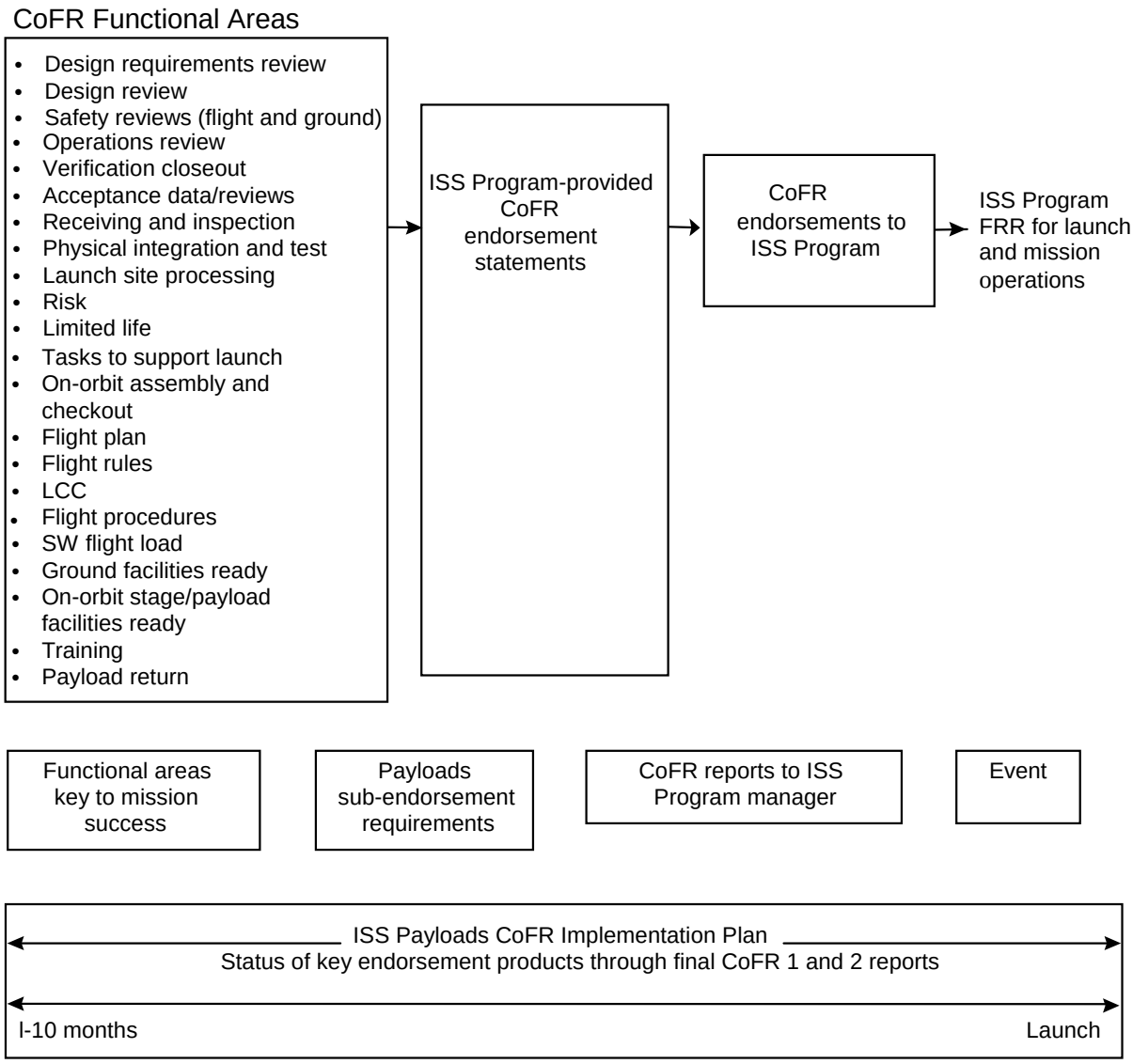


FIGURE 1.5-1 CoFR PROCESS OVERVIEW

D. The CoFR process focuses on readiness at time of launch and crew-related and ground team readiness at the beginning of an increment. The endorsement statements address readiness of HW/SW to be launched and returned for its intended mission; on-orbit readiness to receive the launch items, including life time and cycle limits for all payloads to receive HW; and integrated payload operations.

E. Payloads Office endorsements relative to overall ISS payload readiness will be supported by International Partner (IP) inputs through jointly approved documents, data inputs, joint simulations, and working interfaces. Payload Office CoFR reports will be formally reviewed with IP participation at the Multilateral Payload Control Board (MPCB). An MPCB review will support consistency with IP CoFR recommendations submitted directly to the ISS Program according to requirements

imposed upon them by SSP 50108. No specific endorsements will be submitted by the IPs directly to the Payload Office. IP barter payloads will CoFR according to SSP 52054 as agreed in the collection of JIPs.

1.5.3 PAYLOADS CERTIFICATION TEAM AND REPORTING TREE

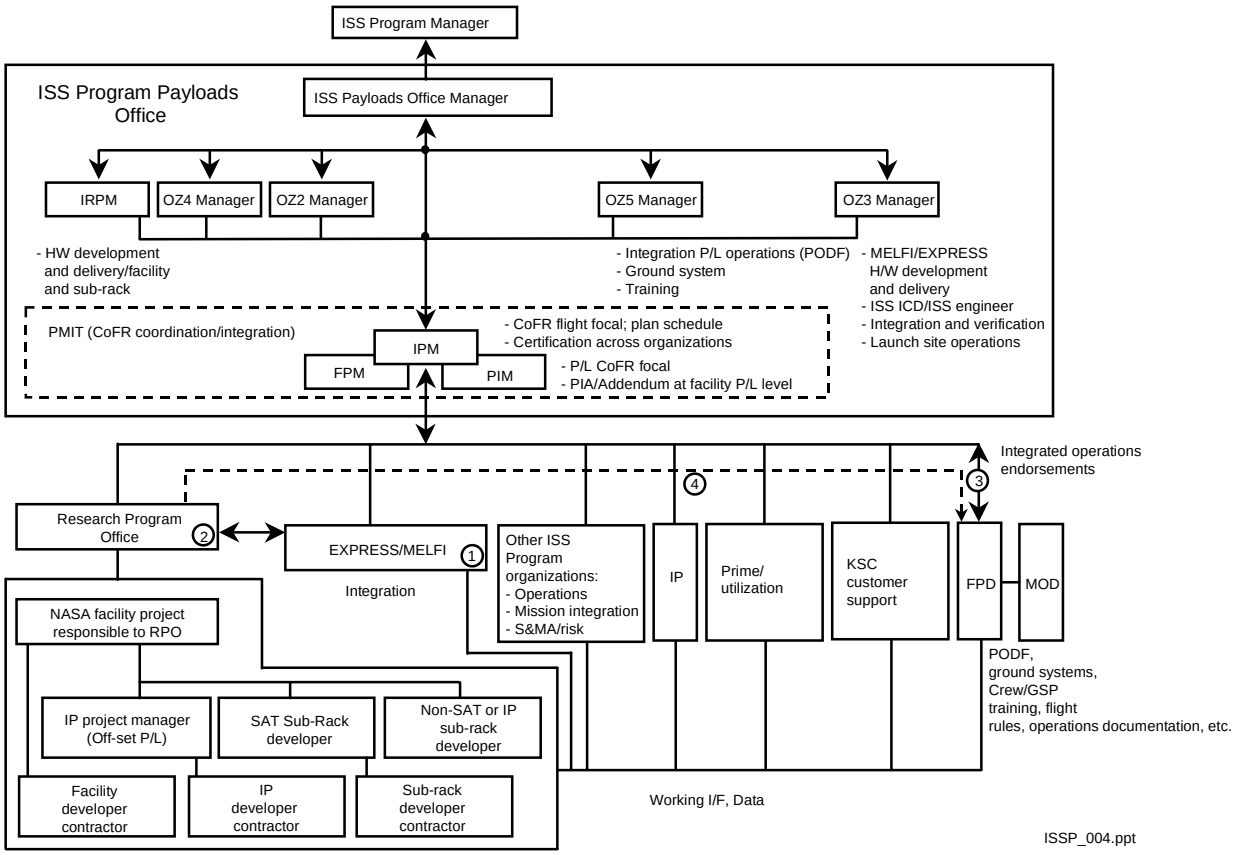
The Research Programs, Project Offices, and NASA Center Line Organizations contracted to support the ISS Program are an integral part of the certification process and will provide endorsements to the ISS Program Payloads Office certifying their readiness according to this plan. Figure 1.5-2, Payloads CoFR Organization and Reporting Tree, provides an identification of CoFR participants and a reporting tree by their function.

The ISS Program Payloads CoFR implementation process is managed by:

1. Increment Payload Manager (IPM): provide CoFR direction to implement CoFR for a flight/increment. Present CoFR reports to the MPCB and Space Station Control Board (SSCB).
2. Flight Payload Manager (FPM): support the IPM for flight-related CoFR implementation. The FPM will coordinate CoFR planning dates and provide the call letters at Launch minus (L-)10 and L-5 months. The FPM will manage the open work tracking log and maintain it current.
3. Payload Integration Manager (PIM)/EXPRESS Payload Integration Manager (EPIM): facilitate CoFR, working directly with the Payload Developer (PD) and Research Program Offices (RPO), to assure delivery of key product deliveries needed to complete CoFR. Coordinate with the RPO and IPM as required to identify and elevate issues.

Any CoFR questions or issues may be addressed with the IPM, FPM, or PIM at any time.

These participants will be referenced throughout this document.



NOTES:

1. EXPRESS/MELFI endorsement is for sub-rack/sub-pallet to rack/pallet interfaces and integrated rack to ISS interfaces, and integrated safety.
2. RPO responsibility:
   a. Where the RPO is the sponsor for the facility and/or sub-rack/sub-pallet payloads, the function, quality, interface, reliability, maintainability, operations, safety, and performance is endorsed through the RPO.
   b. Where the sub-rack/sub-pallet payloads are sponsored by the RPO, but positioned in an EXPRESS or MELFI facility, the RPO endorses function, quality, reliability, maintainability, operations, and safety (reference Note 1 above for interface responsibilities).
   c. All RPO rollout status and CoFR requests will be initiated by the RPO. The PD will submit one consolidated submittal to the RPO. The RPO will distribute the rollout status and CoFR to the responsible offices.
3. All operations endorsements will be provided by the IPM to the FPD for a rollup of payloads readiness for flight and increment support.
4. Through SSP 50108 endorsement requirements.

FIGURE 1.5-2 PAYLOADS CoFR ORGANIZATION AND REPORTING TREE

1.5.4 PROCESS GUIDELINES

The following guidelines are the basis for the ISS Program Payloads CoFR process definition, development, and implementation, per ISS Program Payloads Office responsibility:

A. All Payloads Office endorsements and subendorsements defined in this document will be submitted by the responsible endorsing organization (see Appendices D through I). All endorsement statements will be substantiated by formal documentation.

1. A requirements document or products that defines the basis for successful completion of the work.

2. The documentation supporting the endorsement will have a management/lead signature: analysis, test, inspection, demonstration, or a certification review with closure of requirements documented in minutes, etc.

   The products defined in Appendix C may be considered ISS Program guidance; however, functionally equivalent products must be recognized and traceable to support the endorsement statements. In some special cases, the ISS Program may request a copy of these products.

B. This Payload CoFR Implementation Plan will include implementing organization endorsements used to certify readiness and will be maintained under configuration control. All documentation supporting payload endorsement will be available for review as required.

C. Selected products (Reference Appendix C, Products column) that serve as a basis for substantiation of the endorsement statements will be included in the common schedule database and statused on a regular basis by the ISS Program Payloads Office/PIM and endorsing party. Delivery of these products will demonstrate progress of the CoFR work.

D. A flight or increment-specific payloads CoFR Implementation Plan will not be developed for each flight or increment. Flight or increment-specific endorsements will be provided in checklist format defined in Appendices D through I.

E. Endorsement to the ISS Program Payloads Office of a payload will be made at its highest level:

   1. A facility payload manifested will be endorsed at the facility payload level.

   2. Subracks manifested to be installed in a facility payload already on-orbit will be individually endorsed at the subrack level.

   3. A component (HW/SW) manifested to fly as a replacement item for a facility payload or subrack element already on-orbit will be endorsed at the component level.

   4. Endorsement of the on-orbit facility, with the elements (subrack or components) to be launched and to be integrated into the facility, will be made at the facility payload level.

F. All Cargo Elements (CE), carriers, and HW carried to and from the ISS and operated on the ISS for a flight or increment are documented and controlled in SSP 5410X-XX, Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests).

G. The ISS Program Payloads Office endorsement to the ISS Program Manager will be maintained as a quality record by the ISS Program Configuration Management Office. Retention of the quality record will be made consistent with ISS Program requirements.

H. For payload project ground infrastructure that does not directly support ISS payload command, control, or communication, the CoFR process does not apply.

I. The Shuttle CoFR process will be used for payloads that remain on the Shuttle (Reference NSTS 08117, Space Shuttle Requirements and Procedures for Certification of Flight Readiness). That process will endorse integration and safety. The PD will add an endorsement that the "as-built" payload will function according to requirements to meet research objectives.

J. For commercial reimbursable and non-ISS Program funded payloads, the CoFR endorsements required will be limited to: safety, ISS interface verification, operations/training, and quality where there is a direct interface with the ISS.

   For commercial reimbursable payloads, the Commercialization Manager, Space Station Payload Office, will facilitate and represent the Commercial Project Manager readiness in CoFR reporting to the ISS Program. The Commercial Project Manager will participate in implementation of the CoFR process by providing verification data consistent with endorsement requirements. A signed endorsement statement, by the Commercial Project Manager, will be required to confirm readiness for flight and mission operations.

K. For simple HW items, (i.e., tools that are designed and certified for the life of the Station) endorsement approval for all flights may be granted by the MPCB. When this is approved, re-certification for subsequent flights is not required as long as the configuration is not changed. This is not applicable where a limited life-cycle condition exists

1.6 RESPONSIBILITIES

This section defines the responsibilities at the ISS Program level to integrate the ISS Program Payloads Office responsibilities with other offices where there is a relationship in responsibility.

1.6.1 ISS PROGRAM MANAGER

The ISS Program CoFR process is controlled by the SSCB, chaired by the ISS Program Manager. The ISS Program Manager has overall responsibility for ISS Program approval of the flight and on-orbit configuration, operational, and safety readiness.

1.6.2 ISS PROGRAM PAYLOADS OFFICE MANAGER

The ISS Program Payloads Office Manager will have single-point accountability for providing endorsements, according to SSP 50108, for the articles that are under the Payloads Office purview.

The ISS Program Payloads Office Manager represents the research programs, NASA sponsored payloads (including commercial reimbursable), support organizations, and integrated ISS payload operations in submitting endorsements into the CoFR process.

The ISS Program Payloads Office is responsible for implementing and maintaining the endorsement statements through a disciplined internal process as defined in this CoFR plan. The Payloads Office CoFR quality record will be maintained through the MPCB Configuration Management (CM) process.

Any delegation of responsibility beyond the Deputy/ISS Program Payloads Office requires a delegation of authority letter seven days prior to signoff and will become a part of the formal CoFR documentation. The letter will be addressed to the Launch Package Manager (LPM), with a copy to the ISS Program Configuration Management Office.

1.6.3 NASA RESEARCH PROGRAM OFFICES

The NASA RPO are responsible for endorsing the verification of the flight and ground payload HW/SW, and the payload intra-flight control team operational readiness for each flight and planned increment operations and payload return. The Research Program Manager is the individual responsible for signing the endorsements. Delegation to another office shall be provided in writing to the ISS Program Payloads Office Manager no later than L-5 months of the CoFR process for a specific flight. The NASA RPO endorsements will be reported to the ISS Program Manager through the ISS Program Payloads Office as defined in this document.

1.6.4 OTHER ISS PROGRAM OFFICES

1.6.4.1 OPERATIONS OFFICE MANAGER

Operations Office CoFR responsibility relating to the integrated payload configuration include common integrated Logistics and Maintenance (L&M) requirements between payloads and vehicle systems.

1.6.4.2 VEHICLE OFFICE MANAGER

Vehicle responsibility, as related to payload certification, includes that the vehicle will certify that services at the payload interface can be supported, as provided by the vehicle and defined in the Interface Requirements Documents (IRDs) (pressurized and unpressurized).

1.6.4.3 SAFETY AND MISSION ASSURANCE/PROGRAM RISK OFFICE MANAGER

The Safety and Mission Assurance (S&MA)/Program Risk Office Manager shall have endorsement responsibility as relates to the safety certifications of United States (U.S.) and IP payloads launched in the shuttle and/or operated on the ISS as follows:

A. Individual payloads (flight and ground).

B. Integrated rack (subrack, Payload Support Equipment (PSE), LSE, etc.)

C. Integrated carrier (payloads and carrier Multi-Purpose Logistics Module (MPLM), Unpressurized Logistics Carrier (ULC), etc.).

D. Integrated ISS (vehicle and payload complement).

NOTE: Integrated safety assessment of the IP payload complement and IP elements will be conducted by the IP and provided to the ISS Program to support the integrated ISS assessment.

E. Payload ground systems complement.

1.6.4.4 ISS MISSION INTEGRATION AND OPERATIONS MANAGER

The ISS Program Mission Integration and Operations Manager has assigned the LPM responsibility for planning and coordinating CoFR implementation activities among all certifying organizations. The LPM coordinates across organizations to ensure a thorough review of all defined CoFR readiness is presented.

The LPM will also conduct a LPA dry run and represent rollout status and readiness to the ISS Program Manager at the SSCB/LPA.

Mission Integration Office CoFR responsibilities relating to the integrated payload configuration include:

A. Cargo carrier, with installed payloads, integration into the Launch Vehicle (LV).

B. Cargo carrier certification for the integrated carrier with payloads while in the Orbiter, attached to the Shuttle Remote Manipulator System (RMS), or the Space Station Remote Manipulator System (SSRMS); i.e., MPLM, ULC.

C. Analytical integration that payload stowage is supportable for launch, on-orbit, and return (lockers, drawers, bags, etc.).

1.6.5 MISSION OPERATIONS DIRECTORATE

Mission Operations Directorate (MOD) CoFR responsibilities relating to the integrated payload configuration include:

A. Timeline and procedures to transfer facility/EXpedite the PRocessing of Experiments to the Space Station (EXPRESS) racks and/or subrack payloads from the carrier to the on-orbit location through installation and vice-versa.

B. Timeline and procedures to install the Active Rack Isolation System (ARIS) rack in the laboratory.

C. Timeline and procedures to transfer powered and/or unpowered subrack payloads from the carrier to the on-orbit location through installation and vice versa.

D. Requirements, timelines, and procedures for payload Extravehicular Activity (EVA) activities.

E. Requirements, timelines, and procedures for payload Extravehicular Robotics (EVR) activities.

1.6.6 INTERNATIONAL PARTNERS

The IPs will support the CoFR process as defined in SSP 50108 for Shuttle, Progress, H-II Transfer Vehicle (HTV), and Ariane launches. ISS Program CoFR endorsement requirements are defined for IP certification. The endorsements for payloads will be collected by the ISS Program Payloads Office and used to ensure that a complete and integrated set of endorsements are in place for the payload complement. Payloads with IP barter agreements will use this document as agreed in the collection of JIPs. Payloads coordination with the IPs, relative to the IP endorsement to the ISS Program Manager, will be led by the IPM, in conjunction with the ISS Program IP Office. Any IP endorsement responsibility called out in this document will be consistent with SSP 50200-01, Station Program Implementation Plan, Volume 1: Station Program Management Plan; through SSP 50200-10, Station Program Implementation Plan, Volume 10: Sustaining Engineering, and is summarized as follows:

A. Design, safety, and performance of IP subrack payloads.

B. Design, safety, and performance of the integrated IP rack.

C. Integrated safety of payload complement on an IP LV.

D. Integrated safety of an IP element (integrated payloads and element systems).

1.6.7 KENNEDY SPACE CENTER

The KSC Space Station and Shuttle Payloads Directorate will provide an endorsement to the ISS Program Payloads Office that all payload work assigned to KSC has been successfully completed. This endorsement will be in addition to and consistent, in payload content, with the KSC endorsement provided directly to the ISS Program Manager. The Space Station and Shuttle Payloads Directorate submit will support a complete payload readiness endorsement by the ISS Program Payloads Office. The KSC Space Station and Shuttle Payloads certification of readiness will be formally submitted to in accordance with the ISS CoFR plan and schedule.

1.6.8 FLIGHT PROJECTS DIRECTORATE

The FPD is responsible for endorsing the verification of the integrated payload flight operation readiness. The primary areas are the Payload Operations Integration Center (POIC) ground system and associated interfaces to remote facilities and the International Partners; flight crew payload training; Ground Support Personnel (GSP) to include the POIC cadre and U.S. PD operations teams; Telescience Support Centers (TSCs); operations documentation such as crew procedures, flight rules, ground operations procedures, mission planning products; IP interfaces; and payload

operations safety compliance. To achieve the integrated payload operations readiness endorsement, sublevel endorsements to readiness will be required from the U.S. PDs and science teams and IPs that their ground systems, flight crew training, and the ground support team are ready and all interfaces have been verified. The FPD certification of readiness will be formally submitted to in accordance with the ISS CoFR plan and schedule.

1.6.9 BOEING UTILIZATION

Boeing Utilization is responsible to provide a customer interface for ISS Utilization to ensure payload complement and configuration operability and compatibility with ISS systems and flight crew interfaces. Boeing Utilization will manage and document all interface requirements between the integrated rack and the ISS. The Boeing Utilization responsibility is summarized as follows: develop, manage, and implement the payload to ISS HW/SW interface requirements and control template documentation; develop and manage the payload verification program; define payload topologies; perform integrated payload compatibility analyses at the element and manned base levels; develop interface/assembly schematics and payload layout drawings; provide integrated payload safety panel representation for payload support systems; ensure human factors compatibility of integrated payloads; and provide real-time support to the POIC. The Boeing Utilization certification of readiness will be formally submitted to in accordance with the ISS CoFR plan and schedule.

2.0 DOCUMENTS

2.1 APPLICABLE DOCUMENTS

The following documents include specifications, models, standards, guidelines, handbooks, and other special publications. The current issue of the following documents is identified in the Program Automated Library System (PALS) (http://issa-www.jsc.nasa.gov/cgi-bin/dsql+/ORAP?-h+palshome). The documents listed in this paragraph are applicable to the extent specified herein. Inclusion of applicable documents herein does not in any way supersede the order of precedence identified in Paragraph 1.3 of this document.

SSP 41184	Multilateral Training Management Plan, Volume 2 (Payloads)
SSP 50108	Certification of Flight Readiness Process Document
SSP 50200-01	Station Program Implementation Plan, Volume 1: Station Program Management Plan
SSP 50200-02	Station Program Implementation Plan, Volume 2: Program Planning and Manifesting
SSP 50200-03	Station Program Implementation Plan, Volume 3: Cargo Analytical Integration
SSP 50200-04	Station Program Implementation Plan, Volume 4: Payload Engineering Integration
SSP 50200-05 Part 1	Station Program Implementation Plan, Volume 5: Logistics and Maintenance, Part 1: Maintenance
SSP 50200-05 Part 2	Station Program Implementation Plan, Volume 5: Logistics and Maintenance, Part 2: Logistics
SSP 50200-06	Station Program Implementation Plan, Volume 6: Cargo Physical Processing
SSP 50200-07	Station Program Implementation Plan, Volume7: Training
SSP 50200-08	Station Program Implementation Plan, Volume 8: Increment Execution Preparation
SSP 50200-09	Station Program Implementation Plan, Volume 9: Real-Time Operations

SSP 50200-10	Station Program Implementation Plan, Volume 10: Sustaining Engineering
SSP 50431	Space Station Program Requirements for Payloads
SSP 52000-XXX	Payload Integration Agreements
SSP 52000-PDS	Payloads Data Sets Blank Book
SSP 52050	Software Interface Control Document Part 1, International Standard Payload Rack to International Space Station
SSP 53000-XX	EXPRESS Integration Agreements
SSP 5410X-XX	Increment Definition and Requirements Document for Planning Period X, Annex 1: Station Manifest (Series of Annexes of Flight-Specific Station Manifests)
SSP 57000	Pressurized Payloads Interface Requirements Document
SSP 57001	Pressurized Payloads Hardware Interface Control Document Template
SSP 57002	Payload Software Interface Control Document Template
SSP 57003	Attached Payload Interface Requirements Document
SSP 57004	Attached Payload Hardware Interface Control Document Template
SSP 57010	Pressurized Payloads Generic Payload Verification Plan
SSP 57011	Payload Verification Program Plan
SSP 57013	Generic Attached Payloads Verification Plan
SSP 57057	ISS Payload Integration Template
SSP 58304	Ground Support Personnel Training and Certification Plan
SSP 58318	MSFC Payload Operations Certification of Flight Readiness Implementation Plan, Generic
NSTS 08117	Space Shuttle Requirements and Procedures for Certification of Flight Readiness

NSTS 13830	Payload Safety Review and Data Submittal Requirements for Payloads Using the: - Space Shuttle - International Space Station
NSTS 16007	Shuttle Launch Commit Criteria and Background Document
NSTS 1700.7B	Safety Policy and Requirements for Payloads Using the Space Transportation System
NSTS 1700.7B ISS Addendum	Safety Policy and Requirements for Payloads Using the International Space Station
NSTS/ISS 18798	Interpretations of NSTS/ISS Payload Safety Requirements
NSTS 21000-ICA	Standard Orbiter Crew Compartment Interface Control Annex
NSTS 21000-IDD-MDK	Shuttle Orbiter/Middeck Interface Definition Document Cargo Element Interfaces
JSC 20483	JSC Institutional Review Board Guidelines for Investigators Proposing Human Research for Space Flight and Related Investigations
KHB 1700.7	Space Shuttle Payload Ground Safety Handbook
KHB 1710.2	Kennedy Space Center Safe Practices Handbook

2.2 REFERENCE DOCUMENTS

The following documents contain supplemental information to guide the user in the application of this document. These reference documents may or may not be specifically cited within the text of this document.

SSP 30223	Problem Reporting and Corrective Action for the Space Station Program
SSP 30695	Acceptance Data Package Requirements Specification
SSP 41170	Configuration Management Requirements
SSP 41173	Space Station Quality Assurance Requirements
SSP 50123-01	Configuration Management Handbook Volume 1

SSP 50230	Mission Integration and Operations Office Certification of Flight Readiness Implementation Plan
SSP 50231	Safety and Mission Assurance Certification of Flight Readiness Implementation Plan
SSP 50322	ISS Vehicle Office CoFR Implementation Plan
SSP 50344	Program Integration Office Certification of Flight Readiness Implementation Plan
SSP 50421	Configuration Management Certification of Flight Readiness (CoFR) Implementation Plan
SSP 5410X	Increment Definition and Requirements Document for Planning Period X
NPD 8710.3	NASA Policy for Limiting Orbital Debris Generation
NPG 1441.1C	NASA Records Retention Schedules
NSS 1740.14	NASA Safety Standard Guidelines and Assessment Procedures for Limiting Orbital Debris

3.0 ISS PROGRAM CoFR ENDORSEMENTS

Table 3-1, ISS Program CoFR Endorsements, defines the endorsement statements provided by the ISS Program as defined in SSP 50108.

TABLE 3-1 ISS PROGRAM CoFR ENDORSEMENTS

	Endorsement Statement
a	The design of the flight articles (HW/SW) has been verified to meet the functional and performance requirements in the design-to specifications and will support ISS buildup to Assembly Complete configuration. Any exceptions from the requirements have been approved.
b	The as-built flight articles (HW/SW) have been built to the applicable specifications and drawings. Any exceptions to the design requirements have been approved.
c	All ground processing required for the integration of payload/experiment HW/SW into the ISS LP has been completed.
d	Test, checkout, and servicing of the LP/cargo element have been completed or are planned to be performed.
e	Limited life HW (time, cycle) has been identified and the L&M planning has been accomplished that will support the on-orbit operations.
f	All open items and actions from design, integration, and operations reviews have been closed, completed or planned for completion.
g	All reported HW/SW problems and non-conformances have been resolved.
h	The safety review process, mission assurance analysis and assessments have been completed and identified risks have been accepted. Hazard control verification has been completed.
i	All risk management activities associated with this LP, flight and on-orbit operations have been completed and documented as acceptable.
j	The manifest supports the flight and on-orbit operations.
k	Requirements, design, and configuration changes have been dispositioned and the resulting HW/SW is ready to support the flight and on-orbit operations.
l	All sites, facilities, personnel, and procedures are ready to support the flight and on-orbit operations.
m	Flight rules and crew procedures have been defined and approved.
n	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations.
o	Final flight SW loads have been verified and are acceptable.
p	All operations requirements necessary for successful on-orbit operations have been defined and the planning for implementation has been accomplished.
q	LCC have been defined and approved.
r	Pending planned operations, the on-orbit ISS is ready to accept the LP/cargo element and the orbital transport vehicle.
s	The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable.

4.0 CoFR TIMELINE

The timeline for payload status report and CoFR is defined in Figure 4.0-1.1, Shuttle Launch Payload Status Timeline for Shuttle Rollout; Figure 4.0-1.2, Shuttle CoFR Timeline; Figure 4.0-1.3, Shuttle Launch CoFR Timeline, Crew/Ground Team-Related Endorsement for the First Flight of an Increment; Figure 4.0-2, International Partner Launch CoFR Timeline; and Figure 4.0-3, International Partner Launch CoFR Timeline, Crew/Ground Team-Related Endorsement for the First Flight of an Increment.

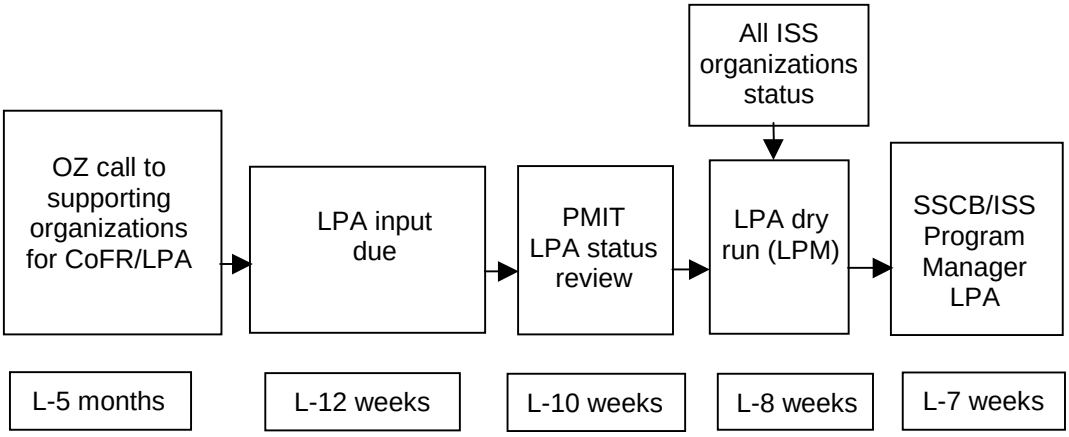


FIGURE 4.0-1.1 SHUTTLE LAUNCH PAYLOAD STATUS TIMELINE FOR SHUTTLE ROLLOUT

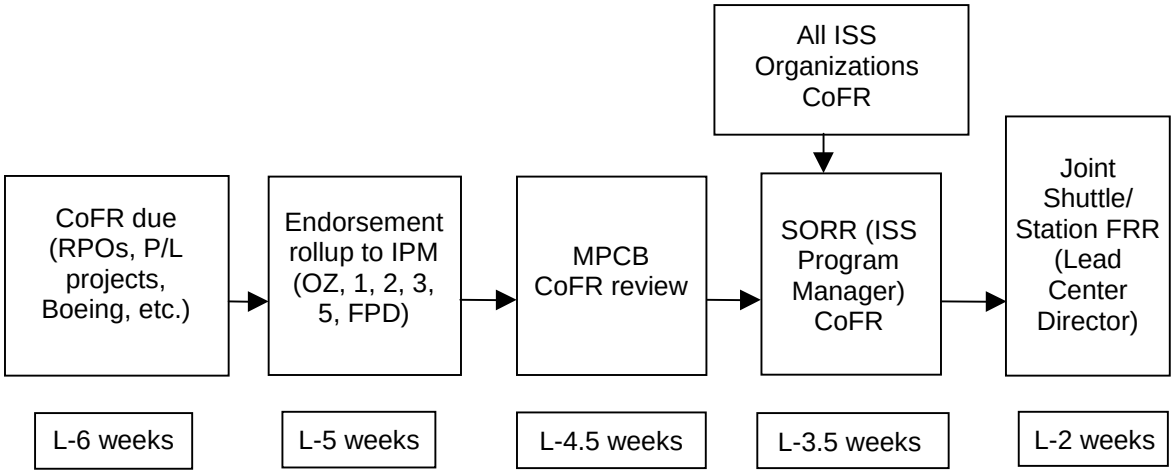
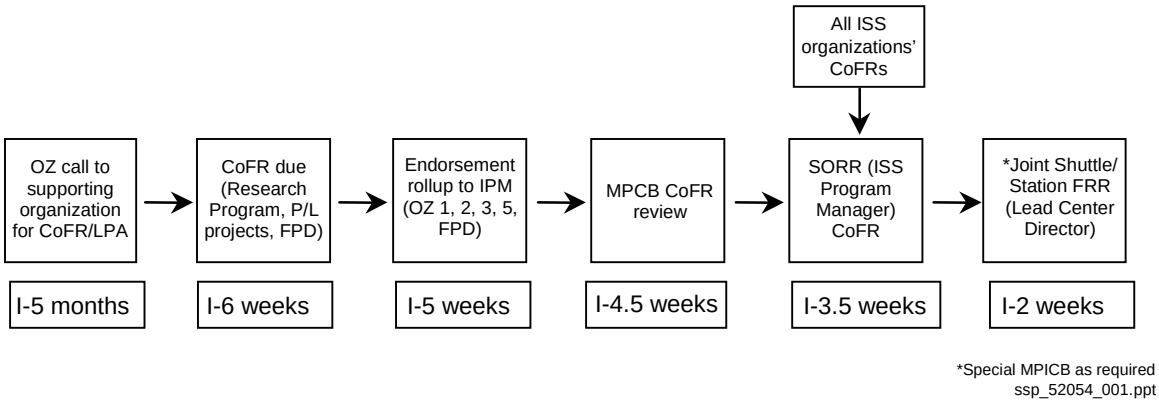
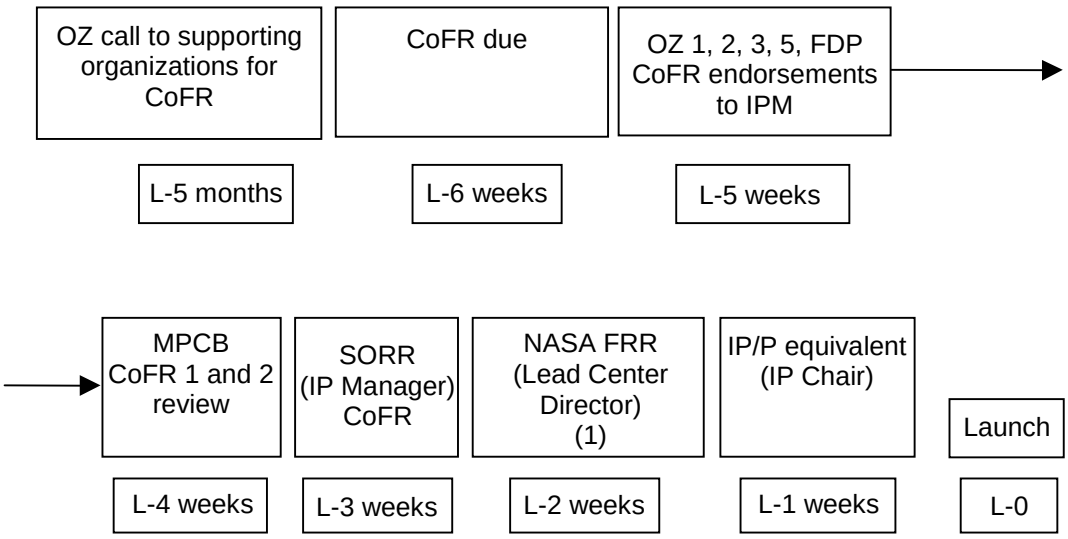


FIGURE 4.0-1.2 SHUTTLE CoFR TIMELINE



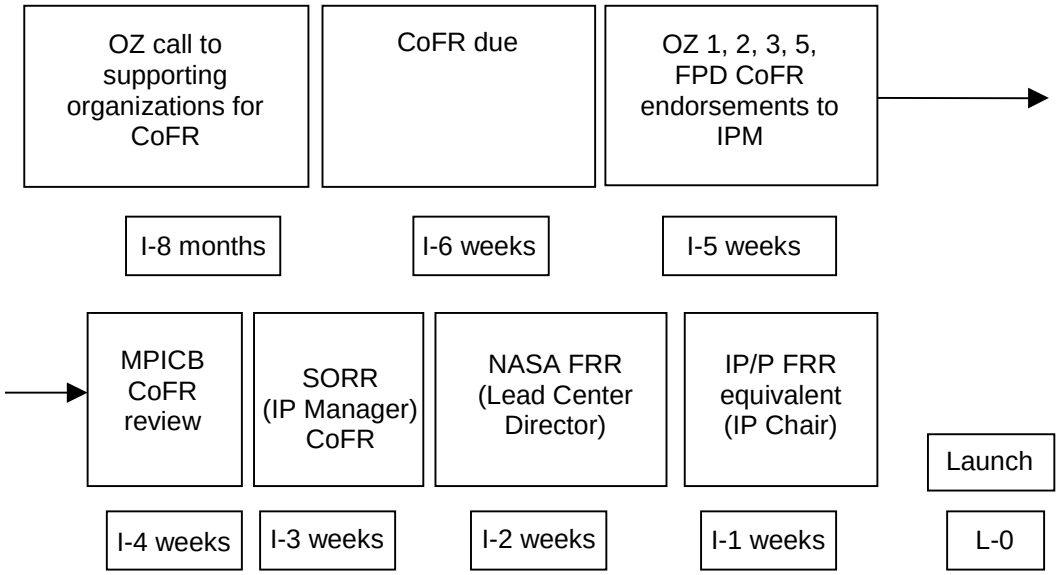
NOTE: Reference increment endorsement defined in Table C-2.

FIGURE 4.0-1.3 SHUTTLE LAUNCH CoFR TIMELINE, CREW/GROUND TEAM-RELATED ENDORSEMENT FOR THE FIRST FLIGHT OF AN INCREMENT



NOTE:
1. For Russian vehicles, NASA will utilize the SORR as the final ISS Program assessment. No NASA FRR will be conducted.

FIGURE 4.0-2 INTERNATIONAL PARTNER LAUNCH CoFR TIMELINE



NOTES:

1. Reference increment endorsement defined in Table C-3.
2. For Soyuz launches, NASA will not conduct an FRR; reference flight-specific schedule.

FIGURE 4.0-3 INTERNATIONAL PARTNER LAUNCH CoFR TIMELINE, CREW/GROUND TEAM-RELATED ENDORSEMENT FOR THE FIRST FLIGHT OF AN INCREMENT

5.0 PAYLOADS OFFICE STATUS AND CoFR PRESENTATION PLAN

The ISS Program Payloads Office Rollout status and CoFR presentation plan is defined in this section (Reference Figure 5.0-1, Rollout Status and CoFR Presentation Plan) and data requests as called out in Section 7.0 and Appendices D through I.

A CoFR report will be presented to the MPCB by the implementing organizations. The IPM will compile the results of all organizations for the ISS Program Payloads Office Manager report to the SSCB.

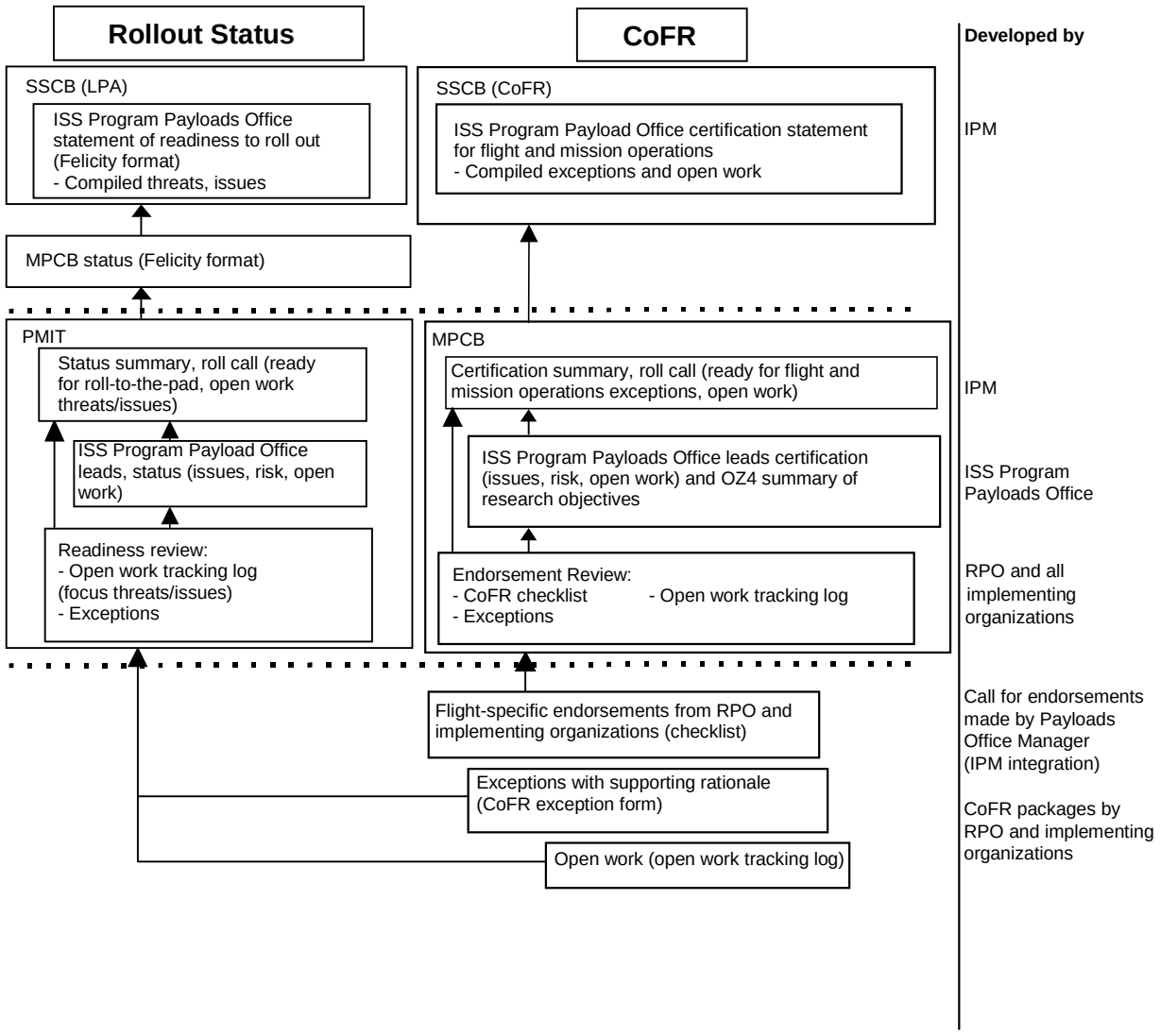


FIGURE 5.0-1 ROLLOUT STATUS AND CoFR PRESENTATION PLAN

6.0 STANDARD FORMS

6.1 EXCEPTIONS TO ENDORSEMENT

Any item (except Standard Open Work) required for the completion of a CoFR endorsement that is not complete at the time of the CoFR review should be identified by the responsible organization on the ISS Program CoFR Exception Form. Standard Open Work is open work that is nominally planned for completion in the time frame between the review and the actual operation. Standard Open Work should be reported at the review, but should not be tracked as a CoFR Exception.

Each CoFR exception will be submitted by the responsible organization with the CoFR Presentation charts. Exceptions will be tracked by the ISS CM and must be dispositioned by the ISS Program Manager or designee.

Reference Figure 6-1, CoFR Exception Form, for the Payload exception form to be used.

(Exception example: A safety hazard report was not signed off by the Chairman of the Payload Safety Review Panel (PSRP). The CoFR endorsement (that the safety review process has been completed) could not be signed. The unsigned hazard report would be identified as an exception to that endorsement, be tracked as an exception until satisfactory close-out, and specifically reported on at the ISS Program review.)

ISS PROGRAM CoFR EXCEPTION FORM		
EXCEPTION NUMBER: (1)	LAUNCH PACKAGE NUMBER: (2)	INITIATING ORGANIZATION: (3)
ENDORSEMENT CODE: (4)		
EXCEPTION DESCRIPTION: (5)		
ACTIONEE: (6)		DUE DATE: (7)
ACTION REQUIRED TO CLOSE EXCEPTION: (8)		
INITIATOR: (9)		DATE:
REVIEW BOARD CHAIR: (10)		DATE:
RESOLUTION OF EXCEPTION: (11)		
ACTIONEE: (12)		DATE
APPROVAL OF RESOLUTION		
INITIATOR: (13)		DATE:
ISS PROGRAM MANAGER: (14)		DATE:

ssp_52054_003_1.ppt

FIGURE 6-1 CoFR EXCEPTION FORM (PAGE 1 OF 2)

1.	Exception Number	This number is assigned by the Review Secretariat for tracking purposes.
2.	Launch Package Number	Identifies the ISS Program LP.
3.	Initiating Organization	Identifies the organization submitting the exception.
4.	Endorsement Code	Identifies the endorsement code(s) that have not been satisfied.
5.	Exception Description	Briefly describes the exception.
6.	Actionee	Identify the person/project manager responsible for providing resolution of the exception and due date.
7.	Due Date	Identify the due date for completing the action to close the exception.
8.	Action Required to Close Exception	Identify the action required to provide exception closure.
9.	Initiator	Signature of the Office/RPO/Project Manager submitting the exception and date signed.
10.	Review Board Chair	Signature of the Review Board Chair accepting the exception and date signed.
11.	Resolution of Exception	Explanation of the resolution of the exception.
12.	Actionee	Signature of the actionee indicating that the exception has been resolved and date signed.
13.	Initiator	Signature of the initiator and date indicating that the proposed action resolution is acceptable and date signed.
14.	ISS Program Manager	Signature of the ISS Program Manager accepting the resolution of the exception and date signed.

FIGURE 6-1 CoFR EXCEPTION FORM (PAGE 2 OF 2)

All exceptions to a specific endorsement shall be appropriately identified by the alpha designator for the requirement code against which the exception is taken. The Readiness Review Secretariat will assign the exception number.

The Readiness Review Secretariat will provide a copy of the original exception (signed by the review board Chair) to the initiator and actionee. Resolution of the exception with actionee signatures will be placed on this form and returned to the Readiness Review Secretariat for appropriate approval and signature.

6.2 OPEN WORK TO COMPLETE ENDORSEMENT

An Open Work Tracking Log is used to track all open work that is required to complete all CoFR endorsements. The tracking log will be submitted to support the rollout status and the CoFR endorsement.

The tracking log will be used to identify threats and issues for status reporting, and will identify all open work against endorsements. Guidelines for reporting this open work are as follows:

A. Work that should have been completed: specific open work will be called out in the Open Work Tracking Log.

B. Work nominally planned to be completed later: this work will be identified at a functional level but a detailed item list is not required where reference can be made to a source that tracks all this work to closure. Completion of all open work will be positively confirmed with the ISS Program Payloads Office (OZ2)/FPM.

A standard Tracking Log will be followed as defined in Table 6.2-1 Open Work Tracking Log. The template is available on the Payload Mission Integration Team (PMIT) web page, under CoFR.

TABLE 6.2-1 OPEN WORK TRACKING LOG

Item Number/ Open Work Tracking Number (2)	Endorsement Number (3)	Description of Open Work	Product Required for Closure/ Closure Plan	Responsible Organization/ Individual	Estimated Completion Date	Risk to Flight (1) (Red/ Yellow/ Green)	Status

NOTES:

1. Red: Will not meet CoFR endorsement and no recovery plan, exception will be required.
   Yellow: currently will not meet CoFR requirement but recovery plan defined with a schedule.
2. Identify payload and payload open work tracking number.
3. Complete this column at CoFR submit (not required at LPA).

7.0 FLIGHT-SPECIFC CoFR IMPLEMENTATION

Flight-specific CoFR implementation is focused on:

A. LPA, payload readiness for transfer to pad and includes a review of:

1. Exceptions (Reference Section 6.1)
2. Open Work Tracking Log, focus on threats and issues (Reference Section 6.2)
3. Readiness statement for payload transfer to the pad (Ready for transfer)

B. CoFR, formal endorsement for flight and mission operations readiness and includes a review of:

1. Endorsement checklist (Reference Appendices D through I)
2. Exceptions (Reference Section 6.1)
3. Open work tracking log (Reference Section 6.2)
4. Endorsement statement for launch and mission operations (Reference Figure 7.0-1, CoFR Endorsement Statement)

Data defined above will be transmitted electronically by the endorsing party to the ISS Program Payloads Office. (Coordinate submission through the lead IPM/FPM). No formal transmission letter is required. For the official CoFR record, a signed endorsement for launch and mission operations will be required as a follow-up to the MPCB CoFR roll call. The electronic data submittal as reviewed at the MPCB and signed endorsement will make up the quality record for CoFR. Any change to the endorsement statement or open work will be reported to the IPM or FPM.

I certify that the “ISS Program Payloads CoFR Implementation Plan” has been satisfied in accordance with my responsibilities. All open work and/or exceptions have been identified.

With completion of open work, I certify readiness for launch and mission operations.

Organization Manager

FIGURE 7.0-1 CoFR ENDORSEMENT STATEMENT

7.1 SCHEDULE OVERVIEW

A. L-12 months - Increment Definition and Requirements Document (IDRD), Annex 1 (Reference SSP 5410X-XX).

B. L-10 months - ISS Program Payloads Office Manager releases a CoFR planning letter with an Endorsement Table to identify ISS Program CoFR responsibilities (Reference Section 7.2).

C. L-10 to L-3 months - Organizations provide CoFR status as required by the ISS Program (status CoFR product delivery and identify potential CoFR endorsement issues).

D. L-5 months through Flight Readiness Review (FRR) (Reference schedule templates in Section 4.0).

7.2 CoFR PLANNING LETTER (L-10 MONTHS)

To support the CoFR endorsement process, a CoFR planning letter including an Endorsement Table will be developed by OZ2 and distributed to the payload community by the ISS Program Payloads Office Manager. This CoFR Endorsement Table is a rollup of the IDRD, Annex 1 (Reference SSP 5410X-XX): Station Manifest, which identifies the organizations responsible for CoFR endorsements submittals. This will be available via the PMIT web page. The ISS Program will report CoFR Endorsement Table updates to the organizations at the MPCB concurrently with Payload Manifest Change Requests (CRs), which results in approved IDRD Annex 1 (Reference SSP 5410X-XX) CRs. Reference Figure 7.2-1, CoFR Planning Letter Example (L-10 Months); Table 7.2-1, CoFR Endorsement Data; and Table 7.2-2, Payload Return Endorsement Data.

TO: Distribution

FROM: ISS Program Payload Office Manager

SUBJECT: Flight XXX CoFR Planning

This letter provides required CoFR endorsement data and identifies International Space Station (ISS) Program CoFR responsibilities for Flight XXX. The CoFR process will be implemented consistent with the requirements of SSP 52054. ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic Revision X.

Please reference the detailed manifest documented in SSP 5410X-XX. Enclosure 1 is the Payloads Office rollup of the Flight XXX payload manifest baseline publication that identifies the RPOs' required CoFR submittals. The Endorsement Table is available on the PMIT Web page: (http://iss-www.jsc.nasa.gov/ss/issapt/payofc/OZ2/pmi.html) and updated per IDRD for PPX, Annex 1 (Reference SSP 5410X-XX): Flight XXX approved CRs.

A written request for rollout status and CoFR will be provided at L-5 months. The projected data is required according to the following plans:

1. Rollout status due at L-12 weeks (XX-XX-XX).
2. Rollout status presented at the PMIT at L-10 weeks (XX-XX-XX).
3. CoFR Payload Endorsement due at L-6 weeks (XX-XX-XX).
4. CoFR Presented at the MPCB at L-4.5 weeks (XX-XX-XX).

Support of the CoFR activities is mandatory. Please address any questions or comments to FPM/XX at 281-244-XXXX (e-mail: XX). PDs should coordinate any issues or questions with their PIM.

Rick Nygren

cc: All PCB Board Members
OZ Distribution
LPM, Flight XXX
KSC Utilization
RPO (Flight XXX)
Facility Projects (Flight XXX)
FPD - Lead POD
OL/Payload CM Lead

FIGURE 7.2-1 CoFR PLANNING LETTER EXAMPLE (L-10 MONTHS)

TABLE 7.2-1 CoFR ENDORSEMENT DATA

RPO	Launch Payload	NASA Project	Launch Carrier	On-Orbit Location		Relocation	LSE Support Requirement	Notes
				Element	P/L Facility			

TABLE 7.2-2 PAYLOAD RETURN ENDORSEMENT DATA

RPO	Return Payload	NASA Project	Return Carrier	Unique Post-Landing Handling Requirements	Notes

7.3 GENERIC FORMAT DESCRIPTIONS OF CoFR ENDORSEMENT CHECKLIST SUBMIT FORM (APPENDICES D THROUGH I)

Appendicies D through I define the checklist of CoFR endorsements applicable to the identified work lead.

7.3.1 CoFR ENDORSEMENT CHECKLIST, PART 1

The CoFR Endorsement Checklist, Part 1 will list all Launch and Return part numbers from the IDRD Annex 1 (Reference SSP 5410X-XX). Reference instruction sheet below to assist in the data required for each category:

A. Flight Number - Identify the applicable flight number per the ISS Program IDRD, Annex 1 (Reference SSP 5410X-XX).

B. Launch Vehicle - Identify launch vehicle for applicable flight per ISS Program IDRD, Annex 1 (Reference SSP 5410X-XX).

C. Stage/Increment Description - Identify the stage this flight supports (assembly time frame) or the increment that this flight supports (post-assembly time frame).

D. Manifest Item Type - Identify one of the following manifest item types: CE, Cargo Item, Payload Rack, Integration HW, Cargo Carrier, FSE, Government Furnished Equipment (GFE), LSE/Station Support Equipment (SSE), GSE, or Middeck (MDK) payload. The return payload section should be used to list payloads returning on the CoFR'd flight.

E. Description - Identify the name of each manifest item type referenced per the applicable flight ISS Program IDRD, Annex 1 (Reference SSP 5410X-XX).

F. Part Number - Identify the part number of each manifest item type referenced per the applicable flight ISS Program IDRD, Annex 1 (Reference SSP 5410X-XX).

7.3.2 CoFR ENDORSEMENT CHECKLIST, PART 2

The CoFR Endorsement Checklist, Part 2 identifies the status of each subendorsement from Appendix C with the associated number. Additional references on this checklist for each subendorsement include the Exception Tracking Number, Open Work Tracking Number, and Notes. Reference definitions below to assist in the data required for each category.

A. Box (Check-off) -

1. ☒ Endorsement has been closed, no open work.
2. ☐ Open work exists, include exception or open work tracking number in appropriate column.
3. N/A Endorsement is not applicable.

B. Number (Trace to Appendix C) - The reference to Appendix C shows the trace to the ISS Program endorsement requirement and defines the content of the payload endorsements and subendorsements.

C. Endorsement - Statement of the endorsement that is to be certified.

D. Exception Column - Assign a number for each exception for traceability. Attach a completed exception form to the endorsement.

E. Open Work Column

All open work items will be assigned a unique number for traceability (Reference Open Work Tracking Log for additional information, due date, actionee, etc.).

7.4 CoFR/LAUNCH PACKAGE ASSESSMENT CALL LETTER

Reference Figure 7.4-1, CoFR/Launch Package Assessment Call Letter (L-5 Months), for the standard call letter requesting CoFR/LPA Submit. The letter is distributed at L-5 months.

To: Organization Manager
(RPO, NASA Center Line Organizations, IPs (as required))

From: Manager, ISS Program Payloads Office

Subject: CoFR/LPA call for Flight XXX (For Increment XX/Flight XXX)

Please provide your LPA report and endorsement of readiness as required by SSP 52054, ISS Program Payloads Certification of Flight Readiness Implementation Plan, Generic , Revision X, dated mm/dd/yy. The support dates and submittal requirements are:

A. LPA

1. Schedule
   - LPA report due (XX/XX/XX)
   - PMIT review report (XX/XX/XX)
2. Products
   - Exceptions
   - Open Work Tracking Log (status red and yellow items)
   - Readiness statement to transfer to pad

B. CoFR

1. Schedule
   - CoFR due (XX/XX/XX)
   - MPCB review (XX/XX/XX)
2. Products
   - Exceptions
   - CoFR endorsements (checklist format)
   - Open Work Tracking Log (status all open work)
   - Endorsement statement for flight and mission operations

Payload HW shall be certified to be in compliance with the requirements defined in:

- SSP 57000, Revision X plus [list IRNs to include in endorsement]
- SSP 52050, Revision X plus [list IRNs to include in endorsement]
- Facility IDD Revision X plus [list IRNs to include in endorsement]

Please be prepared to support this plan. (IPs are invited to participate and discus any issues with the integrated ISS payload operations as presented.)

Any comments or questions should be submitted to the FPM for Flight XXX, (name), (phone), (e-mail), or the PIM for a specific payload.

_____

Manager, ISS Program Payloads Office

cc: All PCB (MPCB as required) Board Members
OZ Distribution
IPM, Increment XXX
FPM, Flight XXX
LPM, Flight XXX
KSC Utilization
RPO (Flight XXX)
Facility Projects (Flight XXX)
MSFC/Lead POD
OL/Payload CM Lead

FIGURE 7.4-1 CoFR/LAUNCH PACKAGE ASSESSMENT CALL LETTER (L-5 MONTHS)

7.5 ENDORSEMENT IMPLEMENTING GUIDANCE

An approach to endorsements in a continuing mission environment is addressed in Figure 7.5-1, Endorsement Approach, and 7.5-2, Endorsement Example. Key items addressed are:

A. Endorsements at the start of an increment

B. Endorsements at a flight within an increment

C. On-going operations across increments

D. Use of real-time data (configuration and status) in the endorsement process

X-1	INCREMENT X	X+1

FLT 1

- Increment - endorsement that crew and ground teams are ready for the increment.
- HW Launched (reference reflight below) - full endorsement of HW AND new O/O configuration.
- HW Returned - endorse HW return (procedures/ground handling address any anomalies and compatibility with environment for return vehicle).
  - Significant new O/O configuration - endorsement of O/O configuration.
  - Simple sample return (no O/O system configuration change) - no O/O endorse required.
- HW Already O/O - will be CoFR'd if:
  - Launched HW is supported by the O/O HW.
  - O/O HW/SW configuration changed since last CoFR or time-cycle constraint (simple sample changeout not a configuration change, consult IPM).

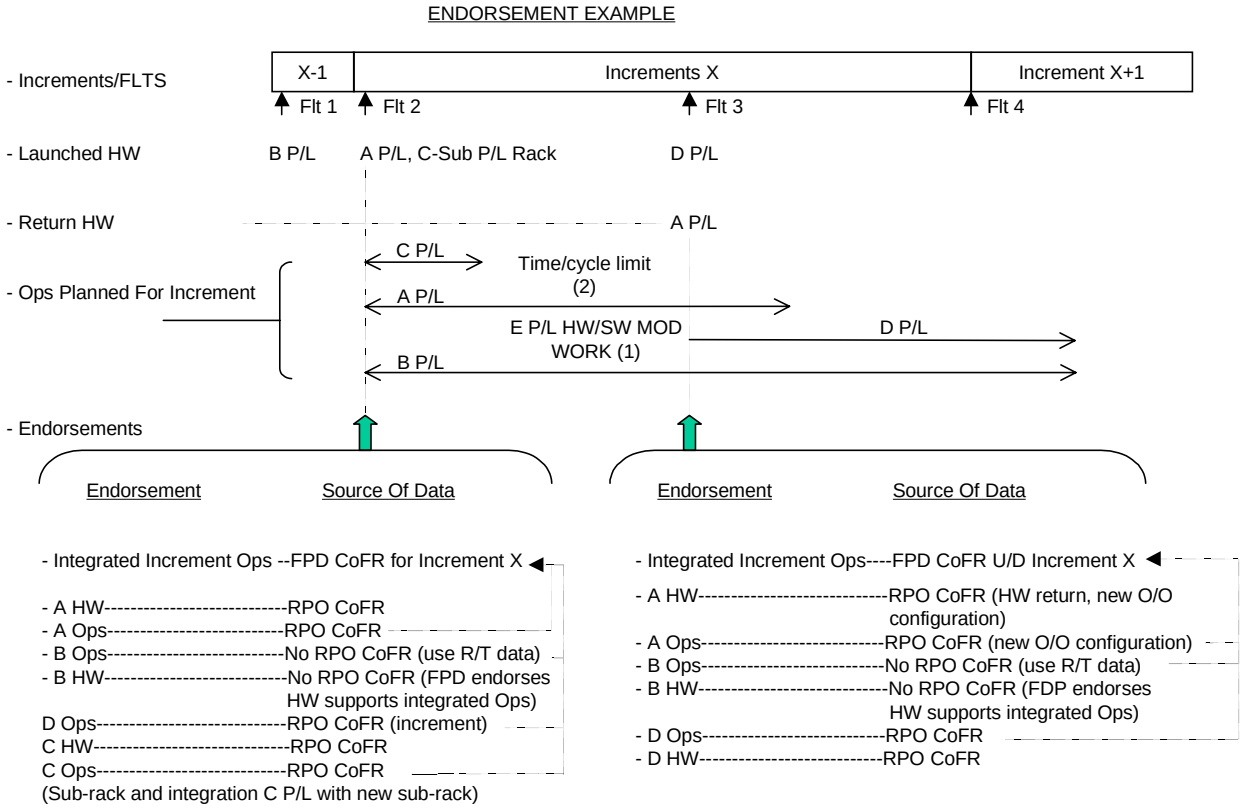
  Note: FPD will endorse payload and vehicle mission supportability with anomaly and resolution plan.
- Reflight
  - HW reflight (same serial number), endorse that last endorsement is still valid, and within life and cycle limits.
  - HW reflight (new serial number), full endorsement of developed HW (reference to last CoFR for design).

FLT 2

- Operations/Train - FPD endorse based on changes at start of increment and R/T data (RPO/PD input thru R/T process)
- HW launched - same as FLT 1
- HW returned - same as FLT 1

Same as FLT 1

FIGURE 7.5-1 ENDORSEMENT APPROACH



NOTES: No formal O/O HW CoFR updates until HW/SW modified or supports launched payload, or time/cycle limit reached.
A through E P/L represents specific payloads.
1. Since E P/L to be modified RPO CoFR on this.
2. Since time-cycle exceeded RPO endorsement life-cycle constraints.

SSP 52054_F7.5-2

FIGURE 7.5-2 ENDORSEMENT EXAMPLE

7.6 MPCB AND SSCB STATUS REPORT PLAN

The ISS Program requires periodic status reports to the SSCB addressing threats and issues during flight preparation. Reports will be submitted in the "Felicity" format. Figure 7.6-1, Shuttle Launch Payload Status, depicts the reporting strategy before and after start of the CoFR process.

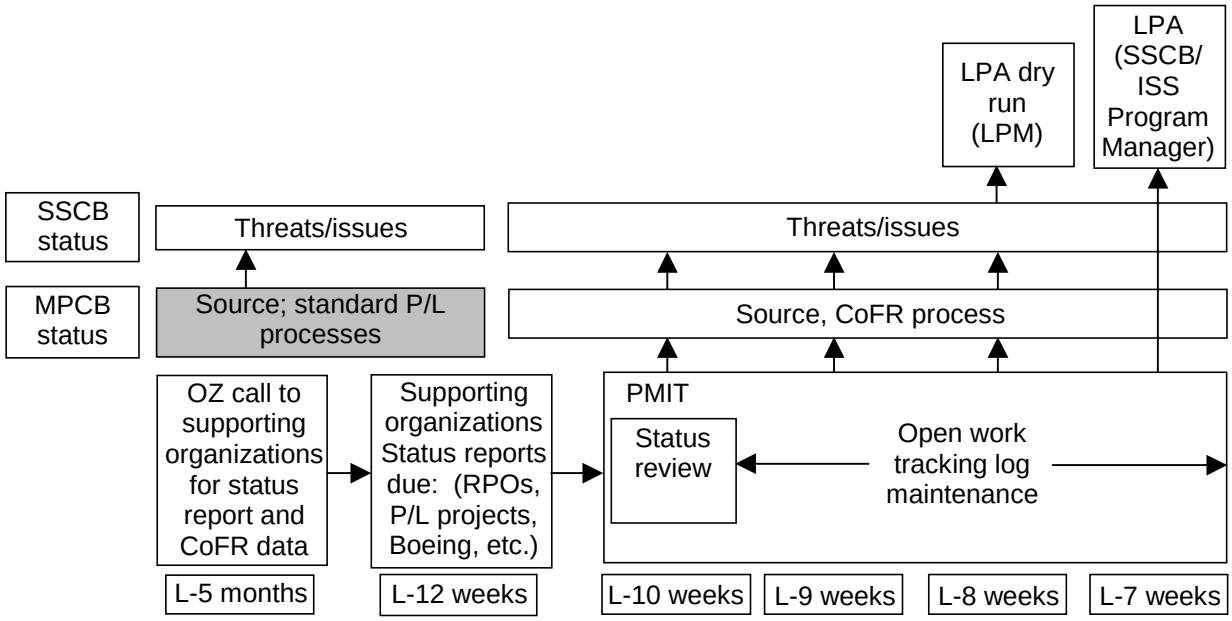


FIGURE 7.6-1 SHUTTLE LAUNCH PAYLOAD STATUS

APPENDIX A

ACRONYMS AND ABBREVIATIONS

APPENDIX A - ACRONYMS AND ABBREVIATIONS

ABCL	As-Built Configuration List
ADP	Acceptance Data Package
AMDP	Accompanying Mission Data Pack
ARC	Ames Research Center
ARIS	Active Rack Isolation System
C&DH	Command and Data Handling
CCCD	Crew Compartment Configuration Drawing
CE	Cargo Elements
CM	Configuration Management
CoC	Certificate of Compliance
CoFR	Certification of Flight Readiness
DQA	Document Quality Assurance
DR	Data Requirement
ECL	Engineering Configuration List
EIA	EXPRESS Integration Agreement
EMI	Electromagnetic Interface
EO	Engineering Order
EPIA	EXPRESS Payload Integration Agreement
EPIM	EXPRESS Payload Integration Manager
ETE	End-To-End
ETOV	Earth-To-Orbit Vehicle
EVA	Extravehicular Activity
EVR	Extravehicular Robotics
EXPRESS	EXpedite the PRocessing of Experiments to the Space Station
FDF	Flight Data File
FLT	Flight
FOR	Flight Operations Review
FPD	Flight Projects Directorate
FPM	Flight Payload Manager
FRR	Flight Readiness Review
FSE	Flight Support Equipment
FSW	Flight Software
GFE	Government Furnished Equipment
GSE	Ground Support Equipment
GSP	Ground Support Personnel
GPVP	Generic Payload Verification Plan
HOSC	Huntsville Operations Support Center
HPR	HOSC Problem Report
HTV	H-II Transfer Vehicle

HW	Hardware
I-	Increment minus
IACUC	International Animal Care and Use Committee
ICA	Interface Control Annex
ICD	Interface Control Document
IDD	Interface Definition Document
IDP	Increment Data Pack
IDRD	Increment Definition and Requirements Document
I/F	Interface
IFA	In-flight Anomaly
IOR	Increment Operations Review
IP	International Partner
IPM	Increment Payload Manager
IP/P	International Partner/Participant
IRB	Institutional Review Board
IRD	Interface Requirements Document
IRN	Interface Revision Notice
IRPM	ISS Program Research Program Manager
ISPR	International Standard Payload Rack
ISS	International Space Station
JARSWG	Joint American/Russian Safety Working Group
JCCT	Joint Cargo Certification Team
JSC	Johnson Space Center
KSC	Kennedy Space Center
L-	Launch minus
L&M	Logistics and Maintenance
LCC	Launch Commit Criteria
LP	Launch Package
LPA	Launch Package Assessment
LPM	Launch Package Manager
LSE	Laboratory Support Equipment
LV	Launch Vehicle
MDK	Middeck
MELFI	Minus Eighty Laboratory Freezer for ISS
MOD	Mission Operations Directorate
MPCB	Multilateral Payload Control Board
MPLM	Multi-Purpose Logistics Module
MSFC	Marshall Space Flight Center
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan

OBT	Onboard Training
ODF	Operations Data File
OISR	Open Item Status Report
OMRS	Operations and Maintenance Requirements Specification
O/O	On-Orbit
Ops	Operations
ORU	Orbital Replacement Unit
OZ	ISS Program Payloads Office
PALS	Program Automated Library System
PCB	Payloads Control Board
PCS	Portable Computer System
PD	Payload Developer
PEI	Payload Engineering and Integration
PHCM	Payload Hazard Control Matrix
PI	Principal Investigator
PIA	Payload Integration Agreement
PIM	Payload Integration Manager
PIRN	Preliminary Interface Revision Notice
P/L	Payload
PLMDM	Payload Multiplexer/Demultiplexer
PMIT	Payload Mission Integration Team
POD	Payload Operations Directorate
PODF	Payload Operations Data File
POH	Payload Operations Handbook
POIC	Payload Operations Integration Center
PP	Planning Period
PRACA	Problem Reporting and Corrective Action
PSE	Payload Support Equipment
PSIV	Payload Software Interface Verification
PSIVF	Payload Software Integration Verification Facility
PSRP	Payload Safety Review Panel
PTCS	Payload Test and Checkout System
PVP	Payload Verification Plan
RAM	Requirements Allocation Matrix
RCAR	Requirements Change Assessment Report
RCN	Requirements Change Notice
RDMA	Risk Data Management Application
RID	Review Item Discrepancy
RM&QA	Reliability Maintainability & Quality Assurance
RMRS	Repeatable Maintenance Recall System
RMS	Remote Manipulator System
RPO	Research Program Offices
RTS	Risk Tracking System

S&MA	Safety and Mission Assurance
SAR	System Acceptance Review
SAT	Science and Technology
SLP	Spacelab Pallet
SORR	Stage Operations Readiness Review
SR&QA	Safety Reliability and Quality Assurance
SSCB	Space Station Control Board
SSCC	Space Station Control Center
SSE	Station Support Equipment
SSRMS	Space Station Remote Manipulator System
SVTL	Safety Verification Tracking Log
SW	Software
TBD	To Be Determined
TBR	To Be Resolved
TBS	To Be Supplied
TSC	Telescience Support Center
U/D	Update
ULC	Unpressurized Logistics Carrier
U.S.	United States
VMDB	Vehicle Master Database
VRM	Verification Requirements Matrix
WAD	Work Authorization Document

APPENDIX B

GLOSSARY OF TERMS

APPENDIX B - GLOSSARY OF TERMS

AS-BUILT CONFIGURATION LIST

A listing of the design center Engineering Configuration List (ECL) mission requirements updated to reflect HW installations, removals, and reconfigurations performed by KSC, with the appropriate Work Authorization Documents (WADs) referenced.

ACCEPTANCE TEST

A formal test to demonstrate that a product meets requirements of the contract and supports acceptability of an item for delivery and flight. It is intended to demonstrate conformance to specification requirements and to act as a quality control screen to detect deficiencies in workmanship, material, processes, and quality.

CARGO ELEMENT

A group of ISS Program flight HW end items or flight elements (Orbital Replacement Unit (ORU) MPLM, ULC, node, etc.) and any associated ISS Program FSE and/or GFE configured into a single entity for support to orbit in a transportation vehicle.

CARGO ITEM

Any item that is transferred to and from orbit via an ISS Program logistics carrier or other ISS Program stowage accommodations (i.e., MDK lockers). Categories of cargo items include: system elements, crew support items, and ISS Program support items (major ORUs, pressurized payloads, payload resupply items, and attached payloads).

CARRIER

An item that supports delivery of Launch Package (LP) items to and from orbit: MPLM, ULC, Spacelab Pallet (SLP), etc.

DEVIATION

A non-compliance proposed before the fact that requires additional analysis or control to eliminate risk and is acceptable when properly documented.

ENDORSEMENT

A responsible organization’s verification of readiness that a stated objective has been met. Endorsements are the highest level of report to a program manager for certification of flight readiness.

ENGINEERING CONFIGURATION LIST

A listing published by a design center for a specific mission configuration, reflecting the top drawing, installation drawing, and indentured drawing that is change letter-sensitive, by quantity, revision letter, and Engineering Order (EO).

EXCEPTION

Any item that does not conform to the established requirement for an ISS Program endorsement. All exceptions will be reported to the ISS Program Manager in the CoFR

report. Planned open work that meets Program schedules is not considered an exception.

FLIGHT

The collection of activities occurring between launch and landing.

INCREMENT

The time period from the docking of a designated crew rotation flight to the docking of another designated crew rotation flight at the ISS, which may include more than one flight.

LAUNCH PACKAGE

The total complement of ISS Program CEs, crew compartment items, and support equipment onboard a LV on a single flight. The LP applies to both assembly and cargo service flights.

MISSION SUPORT TEAM

The ground control team that directly participates in the preparation and implementation of launch, flight, and mission objectives.

OPEN WORK

Work that must be completed to satisfy an endorsement. Planned is open work that is nominally constrained to be completed after CoFR (i.e., interface testing after payload installation). Unplanned is work that is nominally completed before CoFR but has not been done.

PLANNING PERIOD

A Planning Period (PP) is defined as a group of flights with boundaries chosen to be the closest crew rotation flight to the beginning of the calendar year. Crew rotation flights are chosen to preclude placing increments across PP boundaries.

QUALIFICATION

Determination by a series of documented tests and analysis that a part, component, subsystem, or system built to approved specification is capable of meeting performance requirements.

REQUIREMENTS ALLOCATION MATRIX

Document that identifies the WADs, which implement each requirement and provide status of requirements (opened/closed), exception/waiver, and implementation date.

SAFETY ANALYSIS

The technique used to systematically identify, evaluate, and resolve hazards.

SYSTEMS ACCEPTANCE REVIEW

The Systems Acceptance Review (SAR) demonstrates the HW/SW items are certified and ready for shipment to the launch site. The SAR confirms the items meet specification requirements, required documentation is available, and hazard controls are approved. The review considers workmanship, testing, and verification of requirements. Reference SAR outline as defined in SSP 50431, Space Station Program Requirements for Payloads.

VERIFICATION

A process using test, analysis, demonstration, and/or inspection to confirm that a system and its HW/SW components satisfy all specified performance and operational requirements.

WAIVER

A condition found in non-compliance with the IRD and/or Interface Control Document (ICD) but considered suitable “as is” or after rework by an approved method.

WORK LEAD

The organization responsible for directly performing the work and delivering products that are used to support an endorsement statement.

APPENDIX C

GENERIC ENDORSEMENT CONTENT

APPENDIX C - GENERIC ENDORSEMENT CONTENT

The implementation of all endorsements made to the ISS Program must be specifically defined. That definition will include, along with the endorsement statement, identification of the requirement or criteria to be used to measure successful completion of a task and an implementing product.

Table C-1, CoFR Payloads Office Endorsement Content; and Table C-2, Increment CoFR Payloads Office Endorsement Content (Crew/Ground Team-Related Readiness), define the implementing organizations, data, and criteria required to support the Payloads Office endorsement responsibility. Endorsement statements in bold print are consistent with those provided by the ISS Program as defined in SSP 50108.

NOTE: Where a payload is launched on the first flight of an increment, the increment endorsement is covered by the flight endorsement (Table C-1). No separate increment endorsement is required.

Payloads as used in the CoFR Tables C through I are defined as; integrated facility (integrated rack/pallet, with payload complement), subrack/subpallet, aisle deployed, LSE, and FSE.

Refer to SSP 57057, ISS Payload Integration Template, for current required deliverable dates of key integration products.

At the first flight of an increment, an endorsement will be made to state crew/ground team-related readiness for the increment: crew-training, flight products, and mission planning. The specific CoFR increment endorsements are defined in Table C-2.

Updates to Increment Operations Endorsements will be provided for each flight, as required.

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 1 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
a. The design of the flight articles (HW/SW) has been verified to meet the functional and performance requirements in the design-to-specifications and will support ISS buildup to assembly complete configuration. Any exceptions from the requirements have been approved.				
a.1. The payload HW/SW design meets requirements. Any exceptions from design requirements have been approved.				
a.1.a. Functional performance, quality	IRPM	-RPO -(Fac project) -(LSE project) -(Subrack PD) -(Subpallet PD)	-SAR actions -Requirement -Specifications -RM&QA Plan	-PVP -SAR action closure -RM&QA Report
a.1.b. Interfaces	OZ3	-Boeing	-SSP 57000 -SSP 57001 -SSP 57002 -SSP 57003 -SSP 57004 -SSP 52050 -PIRNS	-HW/SW ICDs -PVP-approved exceptions
NOTE: EXPRESS and MELFI Projects endorse sub- to rack/pallet and integrated rack to ISS interfaces.	OZ3	-MELFI Project Manager -EXPRESS Project Manager -(Facility project)	-IDD -IDD MDK	-ICA MDK -HW/SW ICD
NOTE: RPO endorses interfaces of RPO facility.	OZ3	RPO	-IDD -IDD MDK	-ICA MDK -HW/SW ICD

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 2 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
b. The as-built flight articles (HW/SW) have been built to the applicable specifications and drawings. Any exceptions to the design requirements have been approved.				
b.1. The payload flight HW/SW was built and verified to requirement specifications. Any changes or exceptions to requirements have been identified and approved, and all problems are resolved. NOTE: Applies to launch and on-orbit payloads to be CoFR'd b.1.a. Functional performance, quality	IRPM	-RPO -(Facility payload project) -(LSE project) -(Subrack PD) -(Subpallet PD)	-PVP -SAR actions (Requirement specifications)	-Payload Verification Report -SAR actions closure -ADP/IDP -RM&QA Report -RM&QA CoC -PRACA closure
b.1.b. Interfaces			-ICA (MDK) -ISS HW/SW ICDs -RM&QA Plan -PVP	-Payload Verification Report -RCAR -Payload Verification Report
NOTE: EXPRESS and MELFI projects endorse sub- to rack/pallet and integrated rack to ISS interfaces.	OZ3	-EXPRESS project -MELFI project		
NOTE: RPO endorses interfaces if RPO facility.	OZ3	-RPO		
b.2. The Payload Interface Verification Plan has been developed consistent with IRD and IDD requirements and GPVP.	OZ3	-Boeing utilization (IRD) -RPO -(Facility project) -(LSE project) -Subrack PD) -EXPRESS project (IDD) -MELFI project (IDD)	-IRD (section 4 for rack) -IDD for EXPRESS MELFI, pallet, carrier -GPVP	-Unique PVP

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 3 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
b.3. Structural analyses of the NASA ISPRs (exclusive of NASDA ISPRs) have been successfully completed and certified for flight.	OZ3	-Boeing utilization	-IRDs and ICDs	-ISPR integrated rack structural analyses
b.4. All open design center work transferred to KSC has been completed.	OZ3	-KSC	-ADP, open items	-Closure of ADP items
b.5. All design center requirements specified in the ECL have been incorporated, tracked, maintained, and verified. Deviations have been approved.	OZ3	-KSC	-ECL	-ABCL
b.6. The payload was built to the requirements for transfer and operation of U.S. payload HW on the Russian side. The payload has been verified and the required data has been provided to Russia. Russian acceptance of transfer and operation in the Russian module has been received.	OZ3 (OI)	-RPO -(Facility project) -(PSRP) -(JARSWG) -(JCCT)		-PSRP and JARSWG approved safety data pack -JCCT signed certification sheet
b.7. Structural analysis of the integrated pallets have been successfully completed and certified for flight.	OZ3	-EXPRESS project	-IDD	-Integrated pallet(s) structural analysis
c. All ground processing required for the integration of payload/experiment HW/SW into the ISS LP has been completed.				
c.1. Launch site offline processing - Payload post-ship health-check, buildup, and servicing has been completed or scheduled to be completed.	IRPM	-RPO -(Facility project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project	-Payload post-ship check and servicing requirements	-Post-delivery health check problem closure
c.2. Launch site online processing (integration, test, and servicing).				
c.2.a. All payload/subrack/subpallet integration into EXPRESS is complete or is scheduled to be completed.	OZ3	-KSC	-ECL	-ABCL

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 4 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
c.2.b. All pre-carrier integration OMRS requirements have been satisfied, are scheduled to be completed, or have been excepted or waived.	OZ3	-KSC	-OMRS	-RAM
c.2.c. No RCNs are in development that would impact payload/subrack/subpallet operations.	OZ3	-KSC	-RCN	-OMRS (updated)
c.2.d. Stowage has been completed or is scheduled to be completed.	OZ3	-KSC	-OMRS	-RAM
d. Test, checkout, servicing, and ground processing of the LP/CE have been completed or are planned to be performed.				
d.1. All pre-orbiter integration OMRS requirements for the cargo element (payload) have been satisfied, are scheduled to be completed, or have been excepted or waived.	OZ3	-KSC	-OMRS	-RAM
d.2. The cargo element (payload) has been integrated into the LV/carrier or is scheduled to be integrated.	OZ3	-KSC	-WAD	-OISR
d.3. All cargo element payload to LV interfaces have been verified or are scheduled to be verified.	OZ3	-KSC	-OMRS	-RAM
d.4. All GSE supporting the KSC ground operations have been configured and verified per approved documentation and are ready to support.	OZ3	-KSC	-RMRS (KSC-provided GSE) -OISR (PTCS)	-Certified GSE
d.5. Test, checkout, servicing, and ground processing of payloads, that interface directly as a cargo element (i.e., EXPRESS pallet), have been completed or planned to be performed.	-IRPM	-RPO -(Facility project) -EXPRESS project -MELFI project	-Cargo verification requirements	-Cargo Verification Report -Complete IDP
e. Limited-life HW (time, cycle) has been identified, and the L&M planning has been accomplished that will support the on-orbit operations.				

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 5 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
e.1. All payload time and cycle limited-life components have been tracked and documented, and will support the mission along with ORUs and allocated maintenance time. NOTE: Applies to on-orbit payloads to be CoFR'd. NOTE: For subrack/subpallet payloads, only those limited-life components that have been specifically identified as a hazard control in a hazard report shall be endorsed.	IRPM OZ3 OZ3	-RPO -(Facility project) -EXPRESS project -MELFI project -KSC (track life and cycles)	-Requirement specification -Flight plan -ORU component manifest -RM&QA Plan -OMRS -L&M Plan	-ADP Log Book -RM&QA CoC -ADP Log Book and WAD
e.2. Payload maintenance requirements have been identified to support the mission (along with available ORUs, manifested items, and maintenance time).	OZ2 (PIM)	-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project	-Flight Plan -ADP Time and Cycle Log -RM&QA Plan -Spares and ORU list -Logistics Plan	-PIA/EIA Addendum -RM&QA Report -Logistics Report -RM&QA CoC
f. All open items and actions from design, integration, and operations reviews have been closed, completed, or planned for completion.				
f.1. All Project SAR open items and actions are closed.	IRPM OZ3	-RPO -(Facility project) -(LSE project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project	-SAR open items and actions	-Closed SAR actions -RM&QA CoC
f.2. All PIA, EPIA, EIA, Addendum, and Data Sets have been completed. All open items and issues are resolved.	OZ2	-PIM -EPIM -RPO -EXPRESS project -MELFI project	-PIA and PIA Addendum, EPIA, EIA Blank Books -Data Sets Blank Book	-Closed PIA Addendum, Data Sets, EIA, and EPIA TBDs and TBRs
f.3. The IOR/FOR have been conducted, and RIDs and actions are in work.	OZ5	-FPD	-FOR RIDs -IOR RIDs	-Closed RIDs on the FDF implementing documentation

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 6 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
f.4. All KSC Readiness Reviews open items and actions are closed or scheduled to be closed.	OZ3	-KSC	-KSC review actions items	-Closed KSC review actions
g. All reported HW/SW problems and non-conformances have been resolved including payloads to be returned.				
g.1. All payload problems identified during KSC on-line processing have been documented and resolved or are scheduled to be resolved.	OZ3	-KSC	-OISR	-OISR item closed
g.2. For planned payload return, all payload in-flight anomalies, that effect payload return or ground handling, have been closed. Configuration and procedures support payload return. Returned payload is compatible with entry/landing environment for return configuration.	OZ5/FPD	-RPO -(Facility project) -(LSE project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project	-HPR -IFA	-HPR closure -FDF/procedures -IFA closure
g.2. Rollup	OZ5	-FPD	-KHB 1700.7 -KHB 1710.2	
g.3 Reference b.1 for RPO/PD endorsement content.				
h. The safety review process, mission assurance analysis, and assessments have been completed and identified risks have been accepted. Hazard control verification has been completed.				
h.1. The integrated facility payload/LSE/ subrack/subpallet GSE Phase 3 Flight and Ground Safety Reviews have been successfully completed. Any safety waivers have been reviewed and formally approved. The safety Verification Tracking Log has been completed.	OZ2 (PIM) (EPIM)	-RPO -(Facility project) -(Subrack PD) -(Subpallet PD) -LSE project -EXPRESS project -MELFI project	-NSTS/ISS 1700.7B, ISS Addendum -KHB 1700.7 -NSTS 13830 -NSTS/ISS 18798	-Signed Flight Safety Hazard Reports -Approved waivers -SVTL -SR&QA CoC
h.2. Deleted				

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 7 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
h.3. The on-orbit Integrated facility payload/LSE/subracks/subpallet/aisle deployed, and support equipment that controls hazards are operational and within their certified time and cycle life for the increment. Any time or cycle exceedence has been reviewed and approved by the PSRP.	IRPM OZ3	-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project	-Hazard Reports and controls -RM&QA Plan	-Hazard Report closure -RM&QA Report -RM&QA CoC
h.4. Integrated safety assessment (payloads/ISS/carrier) has been completed, and any residual safety risks are accepted (ISS and payload carrier).				
-ISS	OZ2/IPM	-S&MA	-NSTS/ISS 1700.7B, ISS Addendum	-Integrated safety assessment for the stage
-Integrated Carrier (payloads and carrier; i.e., MPLM, pallet)	OZ2/IPM	-S&MA	-NSTS/ISS 1700.7B, ISS Addendum	-Integrated safety assessment for the payloads and carrier
h.5. Independent verification has been performed on all payload flight operational hazard controls and determined to be safe.	OZ5	-FPD	-Hazard Reports	-Completed PHCM -Flight/ground procedures -Flight Rules -Training records indicate closure of hazard control
h.6. The payload is in compliance with the RM&QA requirements in SSP 50431, as tailored by the Project Plan (or equivalent).	-IRPM	-RPO -EXPRESS project -MELFI project	-SSP 50431	-RM&QA assessment -RM&QA CoC
i. All risk management activities associated with the payload, flight and on-orbit operations have been completed and documented as acceptable.				
i.1. All payload risks are determined to be manageable and acceptable (technical, resource, logistics, and operations) all RDMAs resolved.				

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 8 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
i.1.a.	IRPM OZ3	-RPO -(Facility project) -(LSE project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project	-RDMAs or risk tracking system	-Risk Assessment Review with the Payloads Office and closure of all payloads and increment-related RDMAs -RDMA/RTS closure
i.1.b.	OZ2 (PIM) (IPM)	-OZ2 -S&MA/Risk(1) -IP(1)	-RDMAs or risk tracking system	-Risk Assessment Review with the Payloads Office and closure of all payloads and increment-related RDMAs
i.1.c.	OZ3	-OZ3	-RDMAs or risk tracking system	-Risk Assessment Review with the Payloads Office and closure of all payload and increment-related RDMAs
i.1.d.	OZ5	-OZ5 -FPD	-RDMAs or risk tracking system	-Risk Assessment Review with the Payloads Office and closure of all payload and increment-related RDMAs
j. The manifest supports the flight and on-orbit operations.				
j.1. Payload manifest requirements for launch and return are documented and approved.	OZ2 (PIM) (EPIM)	-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project	-PIA, EIA, and EPIA Addendum	-PIA Addendum approval -EIA, EPIA Addendum approval
j.2. Payload manifest requirements for launch and return are implemented in ISS Program documentation and approved.	OZ2 (PIM) (EPIM)	-OZ2/payload manifesting	-PIA Addendum -EIA, EPIA Addendum	-IDRD, Annex 1 (SSP 5410XX-XX)

(1) Endorsement support obtained through joint documents, data deliveries, joint simulations, and working interfaces. Formal endorsements directly to Program Manager and review.

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 9 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
j.3. Payload complement and ISS-level analyses have been performed to assess and confirm compatibility of the payload complement with itself and with resources for the stage.	OZ3	-Boeing utilization	-IRD and ICDs -SSP 57011	-Element and Truss Level PEI Analysis Reports -ISS Level PEI Analysis Reports
j.4. Payload to ISS interfaces have been verified.	OZ3	-Boeing utilization	-Unique PVPs	-Verification Reports
j.5. Pressurized and/or un-pressurized payload stowage requirements for launch, return, and on-orbit configuration are reflected in Program documentation.	OZ2 (PIM) (OZ4)	-OZ2/payload manifesting	-Data Sets (payload configuration)	-VMDB -CCCD (MDK) -SSCD (MPLM/Spacehab) -Transfer List (ISS)
j.6. Payload complement, EXPRESS-level analysis have been performed to assess and confirm compatibility of the EXPRESS payload complement with itself and EXPRESS resources.	OZ3	-EXPRESS project	-IDDs -ICDs	-EXPRESS Report
k. Requirements, design, and configuration changes have been dispositioned, and the resulting HW/SW is ready to support the flight and on-orbit operations.				
k.1. Flight HW/SW content covered by b.1.				
k.2. Ground systems HW/SW content supported by endorsements 1.2, 1.3, and 1.5.				
l. All sites, facilities, personnel, and procedures are ready to support the flight and on-orbit operations.				
l.1. ETE command and data flow has been verified, all anomalies resolved.				
l.1.a. Payload command and telemetry interface. -POIC to TSC -POIC to PI Center -POIC to IP -TSC to PI Center	OZ5	-FPD	-ICDs -Cadre operations product verification procedures	-Closure of all flight-critical problem reports

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 10 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
I.1.b. Science data transmission -POIC to TSC -POIC to PI centers -TSC to PI centers	OZ5	-FPD	-ICDs -Cadre operations product verification procedures	-Closure of all flight-critical problem reports
I.2. Control Center communication interfaces are configured and ready for flight; changes are approved and all anomalies resolved (command, telemetry, video, voice).				
I.2.a. SSCC to POIC	OZ5	-FPD	-ICDs -SSCC to HOSC Test Plan and Procedures	-Closure of all flight-critical problem reports
I.2.b. POIC to TSC	OZ5	-FPD	-ICDs and PIRNs -Test Plan and Procedures	-Closure of all flight-critical problem reports
I.2.c. TSC to PI control center - Rollup	OZ5	-FPD	-ICDs -Test Plan and Procedures	-Closure of all flight-critical problem reports
I.2.d. SSCC to IP control center	OZ5	-MOD -FPD	-(SSCC to IP ICD) -Test Plan and Procedures	-Anomaly closures
I.2.e. POIC to IP control center	OZ5	-FPD	-ICD -Test Plan and Procedures	-Closure of all flight-critical problem reports
I.3. Control center operations tools are complete and ready for mission support (HW/SW), and changes are approved and all anomalies resolved.				
I.3.a. POIC	OZ5	-FPD	-Cadre operations product verification procedures	-Closure of all flight-critical problem reports

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 11 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
l.3.b. TSC Rollup	OZ5	-FPD	-Facility requirement specifications -Data set (Ground Data Services)	-Closure of all flight-critical problem reports
l.3.c. IP Control Center for payload support.	OZ5	-FPD -(IP)[(1)]	-Center requirement specifications	-Verification tests and simulations -HPR system closures
l.3.d. PI Center	OZ5/FPD	-RPO -(Facility Project) -(PI)	-Verification plan -ICD	-Verification report
l.3.d. PI Center Rollup	OZ5	-FPD		
l.4. Control Center procedures are developed and ready for payload mission support, all non-conformances resolved.				
l.4.a. POIC	OZ5	-FPD	-HOSC internal operations procedures -Data systems -Standard operations procedures -Remote joint operations procedures -POH procedures	-Baselined procedures
l.4.b. TSC Rollup	OZ5	-FPD	-TSC internal operations procedures	-Baselined procedures
l.4.c. IP	OZ5/FPD	-RPO -(IP)[(1)]	-IP control center internal operations procedures	-Baselined procedures
l.4.c. IP Rollup	OZ5	-FPD		

[(1)] Endorsement support obtained through joint documents, data deliveries, joint simulations, and working interfaces. Formal endorsements directly to Program Manager and review.

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 12 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
l.4.d. PI	OZ5/FPD	-RPO -(Facility project) -(PI)	-PI control center internal operations procedures	-Baselined procedures
l.4.d. PI Rollup	OZ5	-FPD		
l.5. Payload processing and handling facilities are configured and ready to support the payload mission per requirements (includes pre-and post-landing); all changes are approved and anomalies are resolved.	IRPM OZ3	-RPO -(Facility project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project -KSC	-PIA Addendum -EIA, EPIA Addendum -Data set (KSC support requirements) -Integrated Experiment Requirements Document	-Certification of Readiness Letter
m. Flight rules and crew procedures have been defined and approved.				
m.1. All payload requirements have been defined for flight rules, ground procedures, and crew procedures. NOTE: Applies to launch and on-orbit payloads to be CoFR'd.	OZ5/FPD	-RPO -(Facility project) -(Subrack/subpallet) -(LSE project) -EXPRESS project -MELFI project	-Data Set Blank Book (payload operations requirement)	-Data Set (payload operations requirements)
m.1. Rollup	OZ5	-FPD		
m.2. Mission Operations documentation for the payload has been reviewed and confirmed to implement requirements (crew procedures, ground procedures, and flight rules). NOTE: Applies to launch and on-orbit payloads to be CoFR'd. m.2. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -(Subrack/subpallet) -(LSE project) -EXPRESS project -MELFI project -FPD	-PIA Addendum -EIA/EPIA -Data Set (payloads operations requirement)	-ODF -ETOV FDF -Flight Rules-Ground Command Procedures
m.3. The U.S. PODF has been approved as compliant with ODF standards, flight rules, and hazard/safety requirements.	OZ5	-FPD	-ODF standards -Flight rules -Hazard Reports	-U.S. PODF

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 13 OF 17)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
m.4. Human use and animal care and use protocols have been reviewed and approved.	OZ4	-RPO	-JSC 20483 -ARC Animal Care and Use Handbook	-Written approval of protocols from the JSC IRB (human), ARC IACUC and KSC IACUC (animal) -ODF -ETOV FDF
n. The mission support team and crew have completed training and are ready to support the flight and on-orbit operations.				
n.1. All KSC payload personnel scheduled to support launch and landing have been trained and ready to support.	OZ3	-KSC	-KSC Training requirements	-KSC technical training records
n.2. Flight crew is trained or scheduled to be trained for payload operations. If OBT is planned, OBT products are verified. NOTE: RPO negative report for on-orbit payloads.	OZ5	-FPD -RPO -(Facility Project) -(Subrack/subpallet)	-Data Set (payload training)	-Crew payload training records
n.3. POIC operators are trained or scheduled to be trained for payload mission support.	OZ5	-FPD	-Data Set (payload training) -SSP 58304	-Training records
n.4. Integrated crew and ground controller training has been completed or scheduled to be completed (launched and on-orbit payloads) - Rollup.	OZ5	-FPD	-Payload GSP Training and Certification Plan -Data Set (payload training) -SSP 41184	-Crew training records -Ground controller training records

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 14 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
n.5. TSC/PI console operators are trained or scheduled to complete training for payload mission support (intra-center operations). n.5.a. TSC n.5.b. PI NOTE: RPO negative report for on-orbit payloads. n.5.c. TSC/PI Rollup NOTE: Applicable for increment endorsement if flight support prevents further training after start of the increment.	OZ5/FPD	 -FPD -RPO -(Facility project) -(Subrack PD) -FPD	-Payload Ground Personnel Training and Certification Plan -Data Set (payload training)	-Training records
n.6. IP payload console operators are trained and ready for mission support.	OZ5/FPD	-RPO -(IP)[(1)]	-IP Training Plan	-Training records
n.6. Rollup	OZ5	-FPD		
n.7. Payload processing and handling team is trained or scheduled to be trained (includes pre- and post-landing teams).	OZ3	-RPO -(Facility project) -(Subrack PD) -(Subpallet PD) -EXPRESS project -MELFI project	-Payload Training Plan	-Training records
n.8. Payload Engineering and Integration operators are trained or scheduled to be trained for payload mission support.	-OZ3	-Boeing utilization	-PEI Training Plan	-PEI training records

[(1)] Endorsement support obtained through joint documents, data deliveries, joint simulations, and working interfaces. Formal endorsements directly to Program Manager and review.

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 15 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
o. Final FSW loads have been verified and are acceptable.				
o.1. No changes to the payload SW configuration since delivery have been made. (Changes to the configuration have been made according to CM requirements and the PSRP has been advised.) Verification testing has been completed for all changes. NOTE: Applies to payload on-orbit to CoFR'd.	IRPM OZ3	-RPO -(Facility project) -EXPRESS project -MELFI project	-SW design specification -ADP	-VRM -Revised ADP
o.2. All payload software (including FSW changes) has been tested and verified.	OZ3	-KSC	-OMRS	-RAM
o.3. SW verification of payload interfaces and of the integrated payload complement for the stage configuration completed.	OZ3	-Boeing utilization	-Data Set (C&DH) -Payload ICD (template)	-Boeing utilization reconfiguration database -SW certification test report
o.3.a. SW verification of payload interfaces definition completed.	OZ3	-Boeing utilization	-Data Set (C&DH) -P/L ICD (template)	-Boeing utilization reconfiguration database -SW certification test reports
o.3.b. SW verification of PLMDM reconfiguration products and PSIVF-built payload PCS displays completed.	OZ3	-Boeing utilization	-PSIV verification test procedures	Verification Test Report
p. All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished.				
p.1. All payload requirements for on-orbit operation have been defined and planning for implementation accomplished. NOTE: Endorsement addresses integrated payload compliment (launched payloads and on-orbit payloads to be operated during the mission).				

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 16 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
p.1.a. Allocation requirements for ISS services.	OZ2 (PIM) (EPIM)	-RPO -(Facility project) -(Subrack/subpallet) -EXPRESS project -MELFI project	-PIA, EIA, EPIA Blank Book -PIA Addendum Blank Book	-Baselined PIA, EIA, EPIA, and Addendum with all revisions -Data Set (Planning)
p.1.b. Payload planning requirements (timeline). p.1.b. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -(Subrack/subpallet) -EXPRESS project -MELFI project -FPD	-Data Set Blank Book (Planning)	-Final Data Set (planning) with all revisions and all planning products
p.1.c. Payload operating requirements. p.1.c. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -(Subrack/subpallet) -EXPRESS project -MELFI project -FPD	-Data Set Blank Book (Operations)	-Baselined Data Set (operations) with all revisions -POH -PDF -ETOV FDF -Payload Reqs.
p.1.d. Payload EVA requirements. p.1.d. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -(Subrack/subpallet) -EXPRESS pallet project -FPD	-Data Set Blank Book (EVA)	-Baselined Data Set (EVA) and revisions -ODF -ETOV FDF
p.1.e. Payload EVR requirements. p.1.e. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -(Subrack/subpallet) -EXPRESS pallet project -FPD	-Data Set Blank Book (EVR)	-Baselined Data Set (EVR) with all revisions -ODF -ETOV FDF
q. LCC have been defined and approved.				
q.1. LCC document implements approved LCC requirements.	OZ3	-KSC	-Baselined PIA, EIA, EPIA Addendum	-LCC document NSTS 16007

TABLE C-1 CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (PAGE 17 OF 17)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
r. Pending planned operations, the on-orbit ISS is ready to accept the LP/CE and the orbital transport vehicle.				
r.1. Deleted				
r.2. The status of the on-orbit facility payload/LSE system will support the subrack/subpallet operations.	IRPM OZ3	-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project	-Anomaly list	-Facility payload/LSE Status and Anomaly Report closure
r.3. The payload mission plan for launched payloads along with the on-orbit payload complement is supportable with the current on-orbit payloads and ISS vehicle status with planned anomaly resolution - Rollup.	OZ5/OZ3	-FPD	-Anomaly log (on-orbit payload and vehicle)	-Flight Plan -Anomaly Closure Plan -Chit status
s. The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable.				
s.1. Planned on-orbit payload configuration is compatible with servicing vehicle induced environment (approach mating and departure).	OZ3 OZ5	-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project -(Subrack PD) -(Subpallet PD) -FPD -(IP)[(1)]	-IRD (design environment with approaching vehicle and mating) -Flight Plan	-Assessment of unique payload configuration compatibility with proximity operations and mating conditions. -Procedures implementing guidelines and constraints resulting from above assessment.

[(1)] Endorsement support obtained through joint documents, data deliveries, joint simulations, and working interfaces. Formal endorsements directly to Program Manager and review.

TABLE C-2 INCREMENT CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (CREW/GROUND TEAM-RELATED READINESS) (PAGE 1 OF 4)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
h. The safety review process mission assurance analysis, and assessments have been completed, and identified risks have been accepted. Hazard control verification has been completed.				
h.3. The on-orbit integrated facility payload LSE/subracks/subpallets/aisle deployed and support equipment that controls hazards are operational and within their certified-time and cycle life for the increment. Any time or cycle exceedance has been reviewed and approved by the PSRP.		-RPO -(Facility project) -(LSE project) -EXPRESS project -MELFI project	-Hazard Reports and controls -RM&QA Plan	-Hazard Report closure -RM&QA Report -RM&QA CoC -Time-cycle tracking data
h.5. Independent verification has been performed on all payload flight operational hazard controls and determined to be safe.	OZ5	-FPD	-Hazard Reports	-Completed PHCM -Flight/ground procedures -Flight Rules -Training records indicate closure of hazard controls
m. Flight Rules and crew procedures have been defined and approved.				
m.1. All payload requirements have been defined for flight rules, ground procedures, and crew procedures. NOTE: Applies to launch and on-orbit payloads to be CoFR'd. m.1. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -Subrack/subpallet -(LSE project) -EXPRESS project -MELFI project -FPD	-Data Set Blank Book (payload operations requirement)	-Data Set (payload operations requirements)
m.2. Mission Operations documentation for payloads has been reviewed and confirmed to implement requirements (crew procedures, ground procedures, and flight rules). NOTE: Applies to launch and on-orbit payloads to be CoFR'd. m.2. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -Subrack/subpallet -(LSE project) -EXPRESS project -MELFI project -FPD	-PIA Addendum -EIA/EPIA -Data Set (payload operations requirement)	-ODF -ETOV FDF -Flight Rules

TABLE C-2 INCREMENT CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (CREW/GROUND TEAM-RELATED READINESS) (PAGE 2 OF 4)

Endorsement/Subendorsement	OZ/CoFR Responsible Office	CoFR Approval Authority (Work Lead)	Requirement/Criteria	Product (Product or Activity that Satisfies the Subendorsement)
m.3. The U.S. PODF has been approved as compliant with ODF standards, flight rules, and hazard/safety requirements.	OZ5	-FPD	-ODF standards -Flight Rules -Hazard Reports	-U.S. PODF
m.4. Human use and animal care and use protocols have been reviewed and approved.	OZ4	-RPO	-JSC 20483 -ARC Animal Care and Use Handbook	-Written approval of protocols from the JSC IRB (human), ARC IACUC and KSC IACUC (animal) -ODF -ETOV FDF
n. The mission support team and crew have completed training and are ready to support the increment.				
n.2. Flight crew is trained or scheduled to be trained for payload operations. If OBT is planned, OBT products are verified.	OZ5	-FPD	-Data set (payload training)	-Crew payload training records
n.3. POIC operators are trained or scheduled to be trained for payload mission support	OZ5	-FPD	-Data set (payload training) - Payload GSP Training and Certification Plan	-Training records
n.4. Integrated crew and ground controller training has been completed or scheduled to be completed - Rollup.	OZ5	-FPD	-Payload Ground Personnel Training and Certification Plan -Data Set (payload training)	-Crew training records -Ground controller training records

TABLE C-2 INCREMENT CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (CREW/GROUND TEAM-RELATED READINESS) (PAGE 3 OF 4)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
n.5. TSC/PI console operators are trained or scheduled to complete training for payload mission support (intra-center operations) n.5.a TSC n.5.b. PI n.5.c. TSC/PI Rollup NOTE: Applicable for the increment endorsement if flight support prevents further training during the increment.	OZ5/FPD	 -FPD -RPO -(Facility project) -(Subrack PD) -FPD	-Payload Ground Personnel Training and Certification Plan -Data Set (payload training)	-Training records
p. All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished.				
p.1. All payload operations requirements for on-orbit operation and return have been defined.				
p.1.a. Allocation requirements for ISS services.	OZ2 (PIM) (EPIM)	-RPO -(Facility project) -Subrack/subpallet -EXPRESS project -MELFI project	-PIA, EIA, EPIA Blank Book -PIA Addendum Blank Book	-Baselined PIA, EIA, EPIA, and Addendum with all revisions
p.1.b. Payload planning requirements (timeline). p.1.b. Rollup	OZ5/FPD OZ5	-RPO -(Facility project) -Subrack/subpallet -EXPRESS project -MELFI project -FPD	-Data Set Blank Book (Planning)	-Final Data Set (Planning) with all revisions and all planning products

TABLE C-2 INCREMENT CoFR PAYLOADS OFFICE ENDORSEMENT CONTENT (CREW/GROUND TEAM-RELATED READINESS) (PAGE 4 OF 4)

Endorsement/Subendorsement	**OZ/CoFR Responsible Office**	**CoFR Approval Authority** (Work Lead)	**Requirement/Criteria**	**Product** (Product or Activity that Satisfies the Subendorsement)
p.1.c. Payload operating requirements.	OZ5/FPD	-RPO -(Facility project) -Subrack/subpallet -EXPRESS project -MELFI project	-Data Set Blank Book (Operations)	-Baselined Data Set (operations) with all revisions -POH -PDF -ETOV FDF -Payload requirements
p.1.c. Rollup	OZ5	-FPD		
p.1.d. Payload EVA requirements.	OZ5/FPD	-RPO -(Facility project) -Subrack/subpallet -EXPRESS pallet project	-Data Set Blank Book (EVA)	-Baselined Data Set (EVA) and revisions -ODF -ETOV FDF
p.1.d. Rollup	OZ5	-FPD		
p.1.e. Payload EVR requirements.	OZ5/FPD	-RPO -(Facility project) -Subrack/subpallet -EXPRESS pallet project	-Data Set Blank Book (EVR)	-Baselined Data Set (EVR) with all revisions -ODF -ETOV FDF
p.1.e. Rollup	OZ5	-FPD		

APPENDIX D

ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - KSC UTILIZATION OFFICE

TABLE D-1 CoFR KSC UTILIZATION OFFICE ENDORSEMENT

U.S. Certification of Flight Readiness (CoFR) Certificate Launch Package/Cargo Element Integration Readiness - KSC Utilization			
Flight Number	**Launch Vehicle**	**Stage/Increment Description**	
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.			

TABLE D-2 CoFR KSC UTILIZATION OFFICE ENDORSEMENT CHECKLIST

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	b.4.	All open design center work transferred to KSC has been completed.		
☐	b.5.	All design center requirements specified in the ECL have been incorporated, tracked, maintained, and verified. Deviations have been approved.		
☐	c.2.	Payload launch site online processing (integration, test, and servicing) has been completed or scheduled to be completed.		
☐	d.	Test, checkout, servicing, ground processing, and integration of the cargo element (payload) have been completed or planned to be performed.		
☐	e.1.	All payload time and cycle limited-life components have been tracked and documented.		
☐	f.4.	All KSC Readiness Reviews open items and actions are closed or scheduled to be closed.		
☐	g.	All reported HW/SW problems and non-conformances have been resolved.		
☐	k.1.	All requirements, design, and configuration changes to payload HW/SW have been approved and verified (launch units).		
☐	l.	All sites, facilities, personnel, and procedures are ready to support the payload launch and return.		
☐	n.1.	All KSC payload personnel scheduled to support launch and landing have been trained and are ready to support.		
☐	o.2.	All payload software (including FSW changes) have been tested and verified.		
☐	q.	LCC has been defined and approved.		

APPENDIX E

ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - RESEARCH PROGRAM OFFICE AND PAYLOAD DEVELOPER

TABLE E-1 CoFR RESEARCH PROGRAM OFFICE AND PAYLOAD DEVELOPER ENDORSEMENT

U.S. Certification of Flight Readiness (CoFR) Certificate Launch Package/Cargo Element Integration Readiness - Research Program			
Flight Number	**Launch Vehicle**	**Stage/Increment Description**	
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.			

TABLE E-2 CoFR RESEARCH PROGRAM OFFICE AND PAYLOAD DEVELOPER ENDORSEMENT CHECKLIST (PAGE 1 OF 2)

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	a.	The design of the flight articles (HW/SW) has been verified to meet the functional and performance requirements in the design-to specifications. Any exceptions from the requirements have been approved.		
☐	b.	The as built flight articles (HW/SW) have been built to the applicable specifications and drawings. Any exceptions to the design requirements have been approved.		
☐	c.	All ground processing required for the integration of the payload/experiment HW/SW into the LP has been completed.		
☐	d.	Test, checkout, servicing, and ground processing of the cargo element has been completed or planned to be performed.		
☐	e.	Limited-life HW (time, cycle) has been identified, and the L&M planning has been accomplished that will support the on-orbit operations.		
☐	f.	All open items and actions from design, integration and operations reviews have been closed, completed, or planned for completion.		
☐	g.	All reported HW/SW problems and non-conformances have been resolved (including payloads to be returned).		
☐	h.	The safety review process, mission assurance analysis, and assessments have been completed and identified risks have been accepted. Hazard controls verification has been completed.		
☐	i.	All risk management activities associated with this payload flight on-orbit operations have been completed and documented as acceptable.		
☐	j.	The manifest supports the flight and on-orbit operations.		
☐	l.	All sites facilities, personnel, and procedures are ready to support the flight and on-orbit operations.		
☐	m.	Flight Rules and crew procedures have been defined and approved.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations.		
☐	o.	Final FSW loads have been verified and are acceptable.		
☐	p.	All operations requirements necessary for successful on-orbit operations have been defined, and planning for implementation has been accomplished (launched and on-orbit payloads).		
☐	q.	LCC has been defined and approved.		

TABLE E-2 CoFR RESEARCH PROGRAM OFFICE AND PAYLOAD DEVELOPER ENDORSEMENT CHECKLIST (PAGE 2 OF 2)

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	r.	Pending planned operations, the on-orbit ISS is ready to accept the launched payloads.		
☐	s.	The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable.		

TABLE E-3 INCREMENT CoFR; ENDORSEMENT CHECKLIST FOR RESEARCH PROGRAM OFFICE AND PAYLOAD DEVELOPER

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	h.3	The on-orbit payload and support equipment that controls hazards are operational and within their certified time and cycle life has the increment. Any time or cycle exceedance has been approved by the PSRP.		
☐	m.	Flight Rules and crew procedures have been defined and approved.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations (crew and flight controllers).		
☐	p.	All operations requirements necessary for successful on-orbit operations have been identified, and the planning for implementation has been accomplished.		

APPENDIX F

ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - FLIGHT PROJECTS DIRECTORATE

APPENDIX F - ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - FLIGHT PROJECTS DIRECTORATE

TABLE F-1 CoFR 2 FPD ENDORSEMENT

U.S. Certification of Flight Readiness (CoFR) Certificate Launch Package/Cargo Element Integration Readiness - Flight Projects Directorate			
Flight Number	**Launch Vehicle**	**Stage/Increment Description**	
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.			

TABLE F-2 CoFR FPD ENDORSEMENT CHECKLIST

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	f.	All open items and actions from design, integration, and operations reviews have been closed, completed, or planned to for completion - Rollup.		
☐	g.2.	For planned payload return, all payload inflight anomalies, that effect payload return or ground handling, have been closed. Configuration and procedures support payload return - Rollup.		
	h.5.	Independent verification has been performed on all payload flight operational hazard controls and determined to be safe- Rollup.		
☐	i.	All risk management activities associated with this LP, flight and on-orbit operations have been completed and documented as acceptable - Rollup.		
☐	l.	All sites, facilities, personnel, and procedures are ready to support the flight and on-orbit operations - Rollup.		
☐	m.	Flight Rules and crew procedures have been defined and approved - Rollup.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations - Rollup.		
☐	p.	All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished - Rollup.		
☐	r.3	The payload mission plan for launched payloads along with the on-orbit payload complement is supportable with the current on-orbit payload and vehicle status with planned anomaly resolution - Rollup.		
☐	s.	The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable for payloads - Rollup.		

TABLE F-3 CoFR INCREMENT ENDORSEMENT CHECKLIST FOR FPD

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	h.5.	Independent verification has been performed on all payload flight operational hazard controls, and these controls are determined to be safe - Rollup.		
☐	m.	Flight Rules and procedures have been defined and approved - Rollup.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations - Rollup		
☐	p.	All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished - Rollup.		

APPENDIX G

ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - BOEING UTILIZATION

TABLE G-1 CoFR BOEING UTILIZATION ENDORSEMENT, REFERENCE IPM MANIFEST LIST

U.S. Certification of Flight Readiness (CoFR) Certificate **Launch Package/Cargo Element Integration Readiness - Boeing Payload Engineering Integration**				
Flight Number		**Launch Vehicle**	**Stage/Increment Description**	
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**	**Configuration**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**	**Configuration**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.				

TABLE G-2 CoFR BOEING UTILIZATION ENDORSEMENT CHECKLIST

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	a.1	The payload HW/SW was designed to ISS interface requirements. IRD exceptions are approved.		
☐	b.3.	Structural analyses of the NASA ISPRs (exclusive of NASDA ISPRs) have been successfully completed and certified for flight.		
☐	j.3.	Payload complement and ISS-level analyses have been performed to assess and confirm compatibility of the payload complement with itself and resources for the stage.		
☐	j.4.	Payload to ISS engineering interfaces have been verified.		
☐	n.8	PEI operators are trained or scheduled to be trained for payload mission support.		
☐	o.3.	SW verification of payload interfaces and of the integrated payload complement for the stage configuration completed.		

APPENDIX H

ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - PAYLOAD MISSION INTEGRATION

APPENDIX H - ISS PROGRAM PAYLOADS ENDORSEMENT CHECKLIST BY WORK LEAD - PAYLOAD MISSION INTEGRATION

TABLE H-1 CoFR OZ2/PAYLOAD MISSION INTEGRATION ENDORSEMENT

U.S. Certification of Flight Readiness (CoFR) Certificate Launch Package/Cargo Element Integration Readiness - OZ2/IPM				
Flight Number	**Launch Vehicle**	**Stage/Increment Description**		
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**	**Configuration**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**	**Configuration**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.				

TABLE H-2 CoFR OZ2/PAYLOAD MISSION INTEGRATION ENDORSEMENT CHECKLIST

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	f.2	All PIA, EIA, Addendum, and Data Sets have been baselined, and all open items and issues resolved.		
☐	h.4.	Integrated Safety Assessment (Payloads/ISS/carrier) has been completed and any residual safety risks are accepted. -ISS -Integrated carrier (payloads and carrier; i.e., MPLM, pallet)		
☐	i.1.	All payload risks are determined to be manageable and acceptable (technical, resource, logistics, and operations). All RDMAs are closed. b. IP, S&MA/risk, OZ2 c. OZ3 d. OZ5		
☐	j.2.	Payload manifest requirements for launch and return are implemented in ISS Program documentation and approved.		
☐	j.5.	Pressurized and/or un-pressurized payload stowage requirements for launch, return, and on-orbit configuration are reflected in Program documentation.		

APPENDIX I

EXPRESS (MELFI) ENDORSEMENT CHECKLIST

APPENDIX I - EXPRESS (MELFI) ENDORSEMENT CHECKLIST

TABLE I-1 CoFR; EXPRESS (MELFI) ENDORSEMENT CHECKLIST

U.S. Certification of Flight Readiness (CoFR) Certificate **Launch Package/Cargo Element Integration Readiness - Research Program**			
Flight Number	**Launch Vehicle**	**Stage/Increment Description**	
Launch	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
Return	**Manifest Item Type** (Cargo Element, Cargo Item, Integration HW)	**Description**	**Part Number**
As certified below, this endorsement confirms that the above listed ISS HW/SW and other support HW/SW are ready for use by the ISS Program; all the necessary activities required for integration of the HW/SW into an ISS LP and the applicable LV have been accomplished.			

TABLE I-2 CoFR; EXPRESS (MELFI) CHECKLIST (PAGE 1 OF 2)

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	a.	The design of the flight articles (HW/SW) has been verified to meet the functional and performance requirements in the design-to specifications. Any exceptions from the requirements have been approved.		
☐	b.	The as-built flight articles (HW/SW) have been built to the applicable specifications and drawings. Any exceptions to the design requirements have been approved.		
☐	c.	All ground processing required for the integration of the payload/experiment HW/SW into the LP has been completed.		
☐	d.	Test, checkout, servicing, and ground processing of the cargo element has been completed or planned be performed.		
☐	e.	Limited-life HW (time, cycle) has been identified, and the L&M planning has been accomplished that will support the on-orbit operations.		
☐	f.	All open items and actions from design, integration, and operations reviews have been closed, completed, or planned for completion.		
☐	g.	All reported HW/SW problems and non-conformances have been resolved (including those on-orbit payloads to be returned).		
☐	h.	The safety review process, mission assurance analysis, and assessments have been completed and identified risks have been accepted. Hazard control verification has been completed.		
☐	i.	All risk management activities associated with this payload, flight on-orbit operations have been completed and documented as acceptable.		
☐	j.	The manifest supports the flight and on-orbit operations.		
☐	l.	All sites, facilities, personnel, and procedures are ready to support the flight and on-orbit operations.		
☐	m.	Flight Rules and crew procedures have been defined and approved.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations.		
☐	o.	Final FSW loads have been verified and are acceptable.		
☐	p.	All operations requirements necessary for successful on-orbit operations have been defined, and the planning for implementation has been accomplished (launched and on-orbit payloads).		
☐	q.	LCC have been defined and approved.		

TABLE I-2 CoFR; EXPRESS (MELFI) CHECKLIST (PAGE 2 OF 2)

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	r.	Pending planned operations, the on-orbit ISS is ready to accept the launched payload.		
☐	s.	The induced environment during proximity operations, berthing, docking, mated operations, and departure has been reviewed and is acceptable.		

TABLE I-3 INCREMENT CoFR; CHECKLIST FOR EXPRESS (MELFI)

	Number (Trace to Appendix C)	**Subendorsement**	**Exception** (Tracking Number)	**Open Work** (Tracking Number)
☐	h.3	The on-orbit payload and equipment that controls hazards are operational and within their certified time and cycle life for the increment. Any time or cycle exceedance has been reviewed and approved by the PSRP.		
☐	m.	Flight Rules and crew procedures have been defined and approved.		
☐	n.	The mission support team and crew have completed training and are ready to support the flight and on-orbit operations (crew and flight controllers).		
☐	p.	All operations requirements necessary for successful on-orbit operations have been identified and the planning for implementation has been accomplished.		

APPENDIX J

OPEN WORK

APPENDIX J - OPEN WORK

Table J-1 lists the specific To Be Determined (TBD) items in the document that are not yet known. The TBD is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBD item is numbered based on the section where the first occurrence of the item is located as the first digit and a consecutive number as the second digit (i.e., **<TBD 4-1>** is the first undetermined item assigned in Section 4 of the document). As each TBD is solved, the updated text is inserted in each place that the TBD appears in the document and the item is removed from this table. As new TBD items are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBDs will not be renumbered.

TABLE J-1 TO BE DETERMINED ITEMS

TBD	Section	Description

Table J-2 lists the specific To Be Resolved (TBR) issues in the document that are not yet known. The TBR is inserted as a placeholder wherever the required data is needed and is formatted in bold type within brackets. The TBR issue is numbered based on the section where the first occurrence of the issue is located as the first digit and a consecutive number as the second digit (i.e., **<TBR 4-1>** is the first unresolved issue assigned in Section 4 of the document). As each TBR is resolved, the updated text is inserted in each place that the TBR appears in the document and the issue is removed from this table. As new TBR issues are assigned, they will be added to this list in accordance with the above described numbering scheme. Original TBRs will not be renumbered.

TABLE J-2 TO BE RESOLVED ISSUES

TBR	Section	Description